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Planning

Working Beyond Expectations

Environmental Assessment relating to Modification to MP07-0147 (Mod 4)

Concept Plan Approval North Cooranbong

Property:
Freemans Drive, Cooranbong
Specifically relating to Lot 212 DP1037011 and Lot 1 DP 348173, and additional land part Lot 12 DP 1158508

Applicant:
Johnson Property Group

Date:
October 2016

Watagan Park
NATURE'S PLAYGROUND

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Project Management • Town Planning • Engineering • Surveying
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Document Control Sheet

Issue No.	Amendment	Date	Prepared By	Checked By
A	Draft	18/10/16	S. Hutton	Z. Smurthwaite
B	Final	19/10/16	S. Hutton	Z. Smurthwaite

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1.0 Executive Summary

Johnson Property Group (JPG) has been progressively developing the Watagan Park Residential Estate within the North Cooranbong Residential Estate, which was a State Significant Site and is being developed in accordance with approved Concept Plan (07_0147), as modified.

The estate is located within the Lake Macquarie Local Government Area. Cooranbong is approximately 40km southwest of Newcastle and 100km north of Sydney. Morisset, the closest emerging regional centre, is located 5km to the southwest of Cooranbong.

MP 07_0147 authorises a concept plan that involves the release of up to 2500 low and medium density residential lots, set into a context of environmental conservation and other business, community and open space lands and an interconnected road network, spread over 356 hectares. In addition to the concept plan, there are current state and local planning agreements associated with the development. To date, 1065 residential lots under JPG control are DA approved, of which 458 have construction approval, of which 294 are registered or will be registered by the end of 2016.

The objective of the modification to which this report relates is to identify an alternative local road connection, which is under JPG control and can be delivered by JPG in conjunction with ongoing lot delivery and VPA obligations across the concept plan area.

It is proposed to modify part of the concept plan as follows:

- Include a local road connection for the southern traffic catchment that extends north-easterly, including through part of adjoining 'Thomson' land (with that corridor of land added into the concept approval); and

- Delete dashed local road connection for the southern traffic catchment shown through Lot 2 DP 825266 (noting this land did not form part of the concept approval anyway).

The proposed alternative local road connection:

- allows JPG, who is responsible for delivering the majority of the wider release area and the VPA, to deliver road connectivity and VPA obligations in its own right without reliance on other landowners who do not form part of the concept plan;

- represents a similar road length to the approved connection; and

- will retain the same road type and function as approved (being local road, bus route).

The scope of changes and environmental consequences beyond those which were the subject to the original concept can be looked at in the context of the concept plan approval as a whole. The proposed changes under this modification will not alter the key principles which form the basis of the concept plan approval nor does it represent a radical transformation of the Concept Approval.

That part of the proposed road connection that sits on new land not assessed under the original application and/or approval (ie through the 'Thomson' lands), represents some

247m of road length, over a footprint of some 0.49ha, inclusive of any necessary associated construction works zone.

Consideration of the extent of environmental consequences which arise from the modification (to provide an alternative local road connection) beyond those which were the subject to the original assessment is the subject of this assessment. With the support of a specific ecological assessment relating to the road corridor, it is concluded that by comparison to the approved concept, the environmental consequences arising from the modification are not significant, and can be readily supported and appropriately managed.

It is considered that inclusive of the modification, the environmental, social and economic benefits to the region identified via Concept Plan approval are not diminished.

2.0 Background

This report has been prepared to accompany an application by Johnson Property Group (JPG) to modify the concept plan approval of Major Project 07_0147 (North Cooranbong Concept Plan), under Section 75W of the *Environmental Planning and Assessment Act 1979* (the EP&A Act).

This modification request relates to providing an alternative local road connection, on a corridor of land to be added into the concept plan, to provide local road network connectivity within the southern traffic catchment, which then also connects through to the northern traffic catchment (generally defined by a central east/west aligned environmental riparian corridor separating the urban development area). The alternative link replaces (deletes) a concept road link shown on land that remains excluded from the concept plan.

2.1 CONCEPT PLAN MP 07_0147

Johnson Property Group (JPG) has been progressively developing the Watagan Park Residential Estate within the North Cooranbong Residential Estate, which was a State Significant Site and is being developed in accordance with approved Concept Plan (07_0147), as modified.

The estate is located within the Lake Macquarie Local Government Area. Cooranbong is approximately 40km southwest of Newcastle and 100km north of Sydney. Morisset, the closest emerging regional centre, is located 5km to the southwest of Cooranbong.

On 12 October 2007 the Minister agreed to consider listing an area of land at North Cooranbong in Schedule 3 of the Major Projects SEPP. The resulting SEPP Amendment, rezoning the land to facilitate urban development, was gazetted on 5 December 2008. Those zones are now reflected in the Lake Macquarie Local Environmental Plan 2014 (LMLEP 2014), and consists of residential, business, recreation and environmental zoned lands. A State Planning Agreement was also entered into in December 2008 (and has been subsequently modified).

Concept Plan approval (07_0147) for the North Cooranbong Residential Estate was granted under the former Part 3A of the Environmental Planning and Assessment Act 1979 on the 15th December 2008. This has been subsequently modified, with the most recent modification (Mod 3) being approved on the 9th December 2009.

The approved Concept Plan estimated that Watagan Park Estate will provide up to 2,500 low and medium density residential lots, commercial land, public parks, an educational site, environmental conservation and associated infrastructure, spread over 356 hectares on the eastern border of the Olney State Forest. The site is ideally located within minutes from Avondale College and Avondale School, planned community facilities, playing fields and within close proximity to nearby centres including the emerging sub regional centre of Morisset and within easy access to the M1 Motorway and railway.

Figure 1 illustrates the Structure Plan from the Concept Approval.

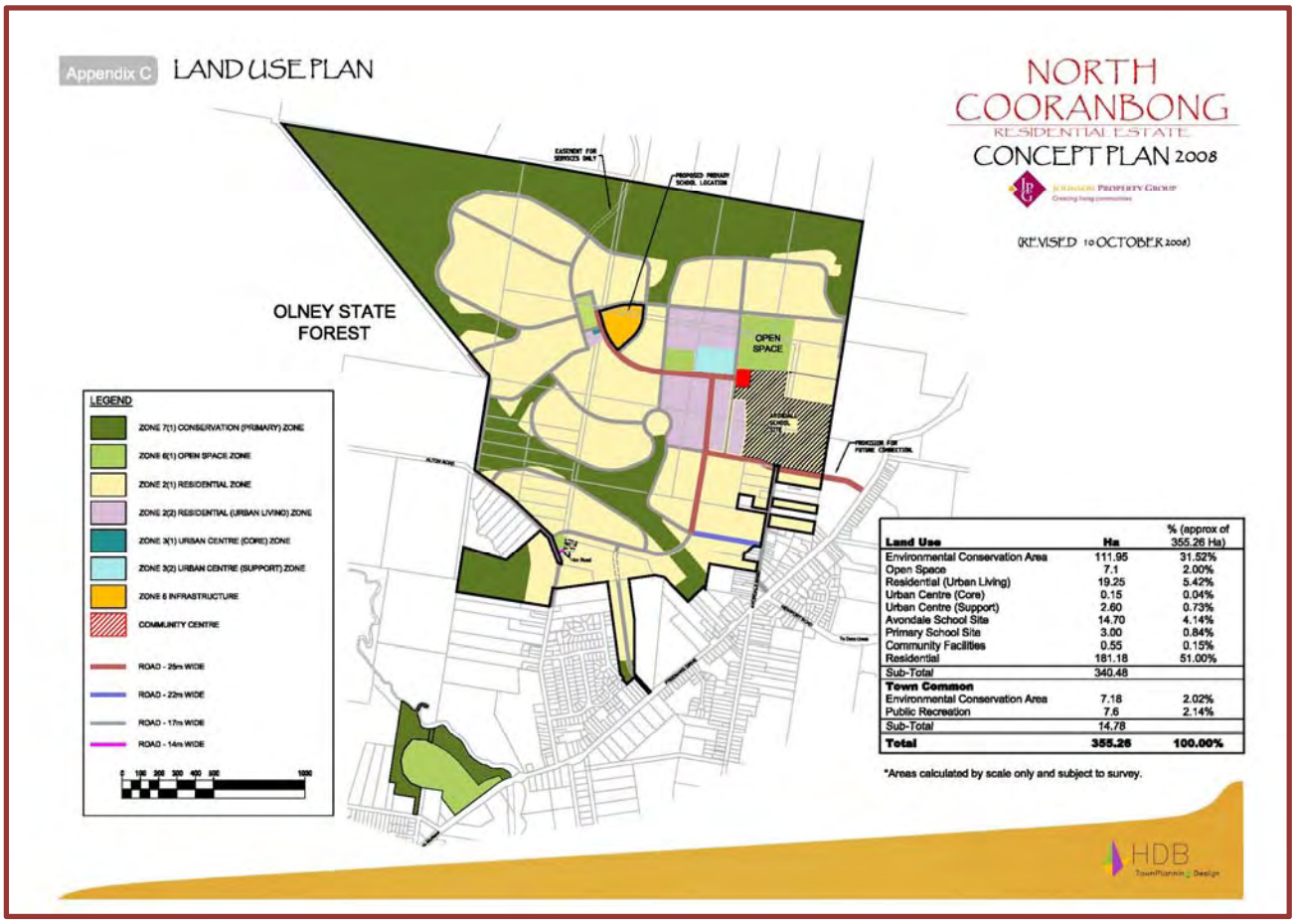


Figure 1: Approved Structure Plan under MP 07_0147.

Concept Approval MP07_0147 is a transitional Part 3A project under the provisions of Schedule 6A of the EP&A Act. As such Part 3A (as in force immediately prior to repeal of Part 3A) continues to apply to the Concept Approval, including the modification provisions of Section 75W.

2.2 DEVELOPMENT TO DATE

The Concept Approval determined that development associated with the Concept Plan is subject to development assessment under Part 4 or Part 5 of the EP&A Act.

Since Concept Approval, JPG and Lake Macquarie City Council (LMCC) has entered into a Local Planning Agreement, the current version dated 1 June 2015. That current agreement is in lieu of Section 94 contributions and includes cash and non-cash contributions, triggered by cumulative lot production.

To date, there is currently a cumulative total of 1065 residential lots that are DA approved that are under JPG control. The majority of the approved residential lots sit within the northern traffic catchment, with 50 approved residential lots only in the southern traffic catchment.

Of the cumulative 1065 residential lots with DA approval, 458 of them have received construction approval (and are under the control of JPG) and of those 294 have been registered or are to be registered by the end 2016 (also under the control of JPG). There is a further 5 lots registered to date that are outside lands under JPG control, but within the concept approval area. The registered lots are located primarily in the north-east portion of the main development area (including Precincts 1 and part Precinct 2).

Figure 2 provides a snapshot of development approvals to date for information purposes.

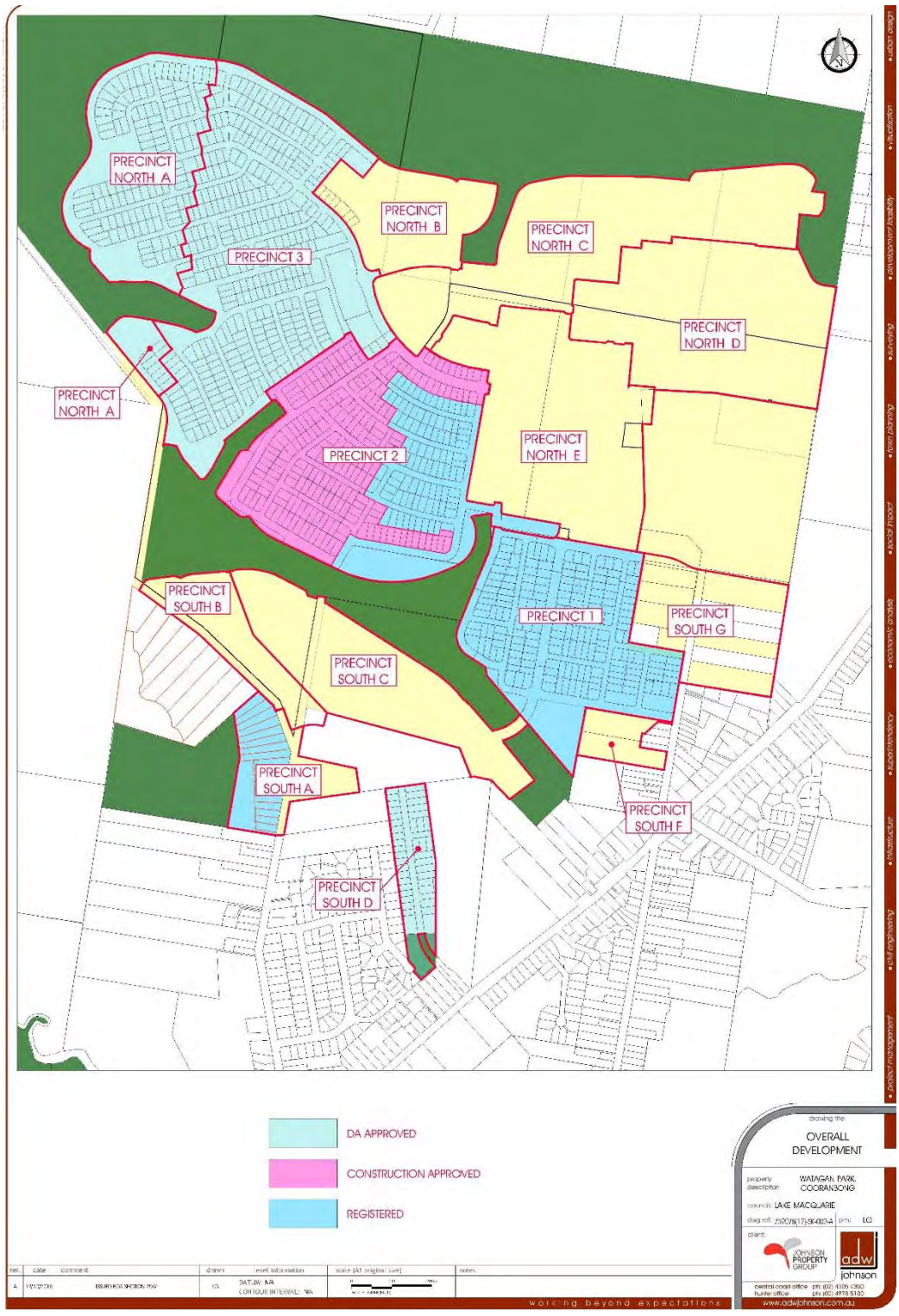


Figure 2: Development Approvals as at October 2016.

2.3 LOCAL ROAD CONNECTION WITHIN SOUTHERN DEVELOPMENT AREA

It is noted that Lot 2 DP 825266 (a 5.05ha area of land located centrally in the southern part of the main development area) was removed from the concept plan prior to approval, due to withdrawal of land owners consent (known as 'Dabson' lands). At that time, whilst an east-west road alignment was shifted northwards into land under control of JPG, a dashed line was included through the excluded 'Dabson' land indicating a concept north-south local road connection within the southern traffic catchment. That connection connected residential land (under JPG control) between the environmental riparian zone and the excluded land, and then southwards to a new central site access at Freemans Drive. The southern leg of the connection sits within land known as 'Twine' land, being Lot 212 DP 1037011 and Lot 1 DP 349173, which forms part of the concept plan and is under JPG control.

As established under the current Planning Agreement between JPG and Lake Macquarie City Council (LMCC) (dated 1 June 2015), the new central site access is to be a new traffic signalisation intersection (Item 15). Those works are currently to be provided prior to the release of a subdivision certificate for the 600th residential lot or prior to the release of subdivision certificate for the 100th residential lot in the southern traffic zone.

The road network and traffic and transport benefits of those intersection works will only be realised when the southern traffic catchment is connected beyond the 'Twine' lands. The 'Twine' lands were approved by LMCC in February 2012 for 32 residential lots in two stages under DA1574/2012. That consent provided consistency with the concept plan by including a road to its northern boundary within stage 2 (being the common boundary with Dabson lands). However, JPG have no control over the land that the connection is currently shown across to the north of 'Twine' land (excluded from the concept plan and known as 'Dabson' lands). It is understood that to date, no application for subdivision of that land has been made since it was rezoned 8 years ago.

As outlined below in Section 2.4, JPG have identified an alternative to the road connection through 'Dabson' lands, which is the subject of this modification application. Once that connection has been recognised, a consistency amendment will be sought to DA 1574/2012 ('Twine' approval) for LMCC assessment and determination.

2.4 ADJOINING LAND

As part of JPG's progressive development of Watagan Park, control has been secured more recently over a 5.855ha parcel of land immediately adjoining the concept plan area, east of the 'Twine' land, being Lot 12 DP 1158508, 617 Freemans Drive (known as 'Thomson' lands).

With the introduction of the Water Industry Competition Act (WIC Act) 2006 and the regulations supporting its implementation in 2008, investigations were undertaken for water and sewerage services to be provided by a licensed private sector entity, and contractual arrangements were then established for private sector supply of water and sewer services for Watagan Park. Most recently, on 30 August 2016, a judgement from the NSW Land and Environment Court approved, with conditions, a utility installation (water recycling facility for the treatment of sewage) (DA714/2014) on part of the 'Thomson' land. Whilst the development consent was able to be issued independent of the concept plan approval, that infrastructure will service the ongoing development of Watagan Park. **Appendix 3** includes a copy of the approved plans for background purposes.

Separately, LMCC are progressing a planning proposal over the 'Thomson' lands, which currently sits in a transition zone, being RU6 (Transition). That planning proposal (PP_2014-_LakeM_002_00) received gateway determination in October 2014, was publicly exhibited during late 2015, and whilst put on hold by Council pending the utility installation judgement reference above, is now being finalised by LMCC (and scheduled to be reported to Council during November 2016). If adopted by LMCC, it will be provided to DPE for final assessment and plan making and will rezone the land for infrastructure, urban (residential) development and conservation purposes. Whilst this modification is not reliant upon the outcome of that planning proposal (as roads are a permitted use in the existing transition zone and can be independently considered subject to satisfying the relevant zone objectives), **Appendix 4** includes a copy of the most recently supplied draft zoning plan from JPG to LMCC, for background purposes.

JPG have identified that a local road connection across part of this land (rather than north through 'Dabson' lands), could be provided under their control and aligned to the ongoing lot delivery and VPA obligations of the wider concept plan. This will facilitate JPG delivering a local road network connection within the southern traffic catchment to the new central intersection (as well as through to the northern catchment), and can assist in providing the road network and traffic and transport benefits sought from its provision, beyond the currently approved 32 residential lots that only connect to it at present.

3.0 Proposed Modification

3.1 OBJECTIVES OF THE MODIFICATION

The objective of the modification is to identify an alternative local road connection (for the southern traffic catchment and its connection to the new intersection to be constructed on Freemans Drive), which is under JPG control and can be delivered by JPG in conjunction with ongoing lot delivery across the concept plan area.

3.2 DESCRIPTION OF THE MODIFICATION

It is proposed to modify part of the concept plan as follows:

- Include a local road connection for the southern traffic catchment that extends north-easterly, including through part of adjoining 'Thomson' land (with that part of the land added into the concept approval); and

- Delete dashed local road connection for the southern traffic catchment shown through Lot 2 DP 825266 (noting this land did not form part of the concept approval anyway).

Figure 3 shows a comparison between the approved road network and the proposed road network (refer also **Appendix 1**). **Figure 4** shows the proposed road connection incorporated into the wider Structure Plan (refer also **Appendix 2**).

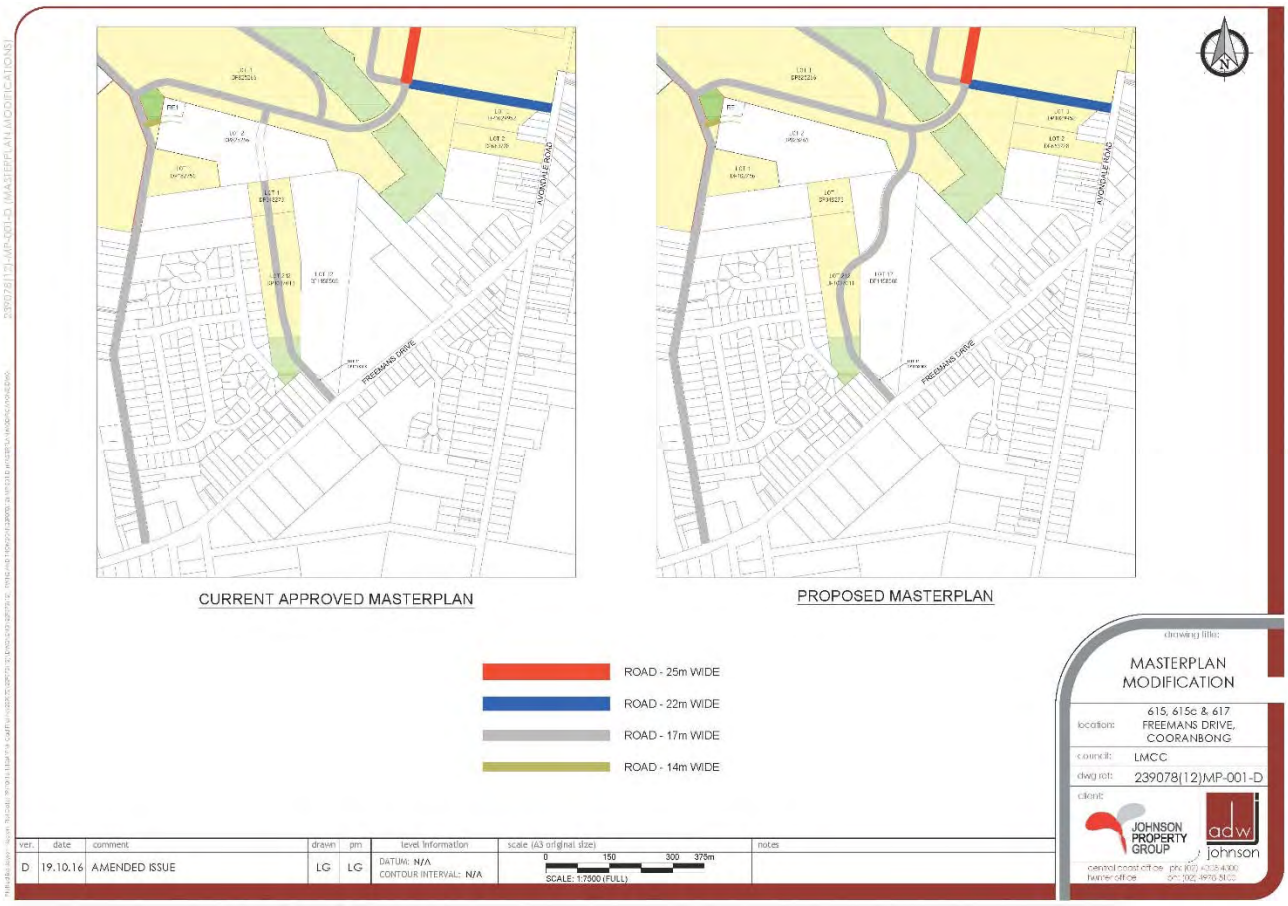


Figure 3: Comparison between approved and proposed extract of Concept Plan.

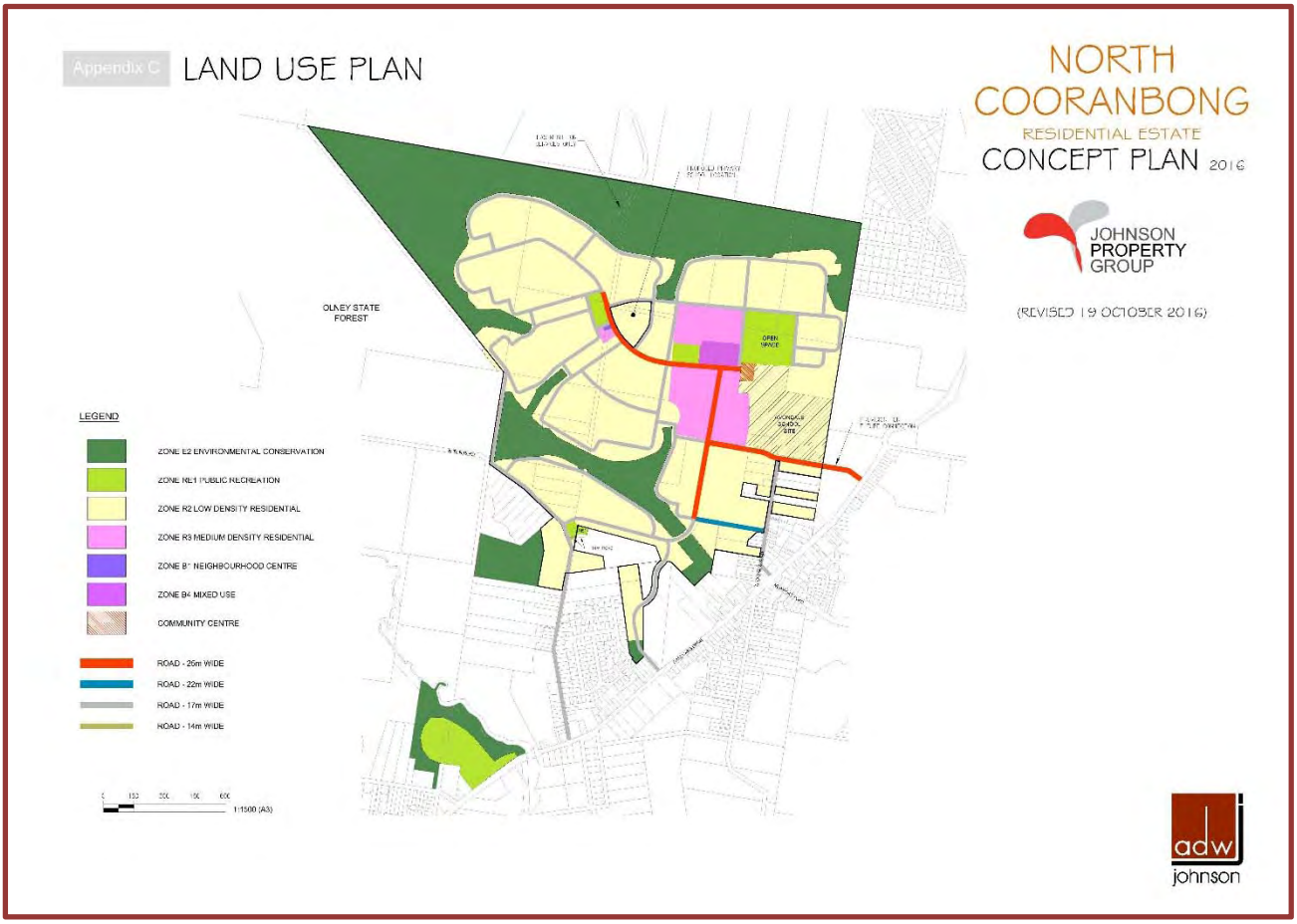


Figure 4: Proposed Structure Plan incorporating amendment.

The proposed alternative local road connection:

- allows JPG to deliver road connectivity and VPA obligations in its own right without reliance on other landowners who do not form part of the concept plan;
- represents a similar road length to the approved connection (additional 2m of road length), when measured from the intersection on Freemans Drive to the south, through to its connection to the east/west road within the southern traffic catchment (proposed total 737m length, approved total 735m length); and
- will retain the same road type and function as approved (being local road, bus route).

That part of the proposed road connection that sits on new land not assessed under the original application and/or approval (ie through the 'Thomson' lands), represents some 247m of road length, over a footprint of some 0.49ha, inclusive of any necessary associated construction works zone. The construction value of that section of road has been estimated at $309,000.

Please note that the Concept Plan shown in Figure 4 and included in Appendix 2 has incorporated a number of consistency updates being:

- To reflect the standard instrument and current LEP zone descriptions under Lake Macquarie LEP 2014 (LMLEP 2014), which came into force in 2014;

- To reflect LMLEP 2014 Amendment 14, which came into force in 2016, to include the identified primary school site in the residential zone; and
- To reflect the current DA approved road network (other than as per road network amendment sought in this modification).

3.3 LAND TO BE ADDED

The land to be added is limited to the identified alternative road corridor, generally as shown and described in Section 3.2 above. It consists of part of Lot 12 DP 1158508, 617 Freemans Drive, North Cooranbong (part of the 'Thomson' lands). Whilst the title covers an area of some 5.855ha, the area to be added is the concept road corridor (with construction zone) of approximately 0.49ha.

The area to be added is currently zoned RU6 Transition under Lake Macquarie Local Environmental Plan (LMLEP) 2014 (refer to Section 2.4 earlier, road is a permitted use in the existing transition zone and can be independently considered and is not reliant on the rezoning of the wider 'Thomson' lands).

Land to the east of the 'Thomson' lands are also zoned RU6 with lands directly to the west and north were rezoned for urban development ahead of the 2008 concept plan approval, and primarily consists of residential zoned land, extending northwards through to an environmental zoned riparian corridor further north.

The proposed road corridor, within the 'Thomson' lands, sits to the north of the approved utility installation.

Whilst yet to be reported by LMCC for final adoption, the proposed road corridor has been purposely sited to sit wholly within land most recently identified to be rezoned for residential purposes and clear of an existing dwelling house (which sits to the east of the road corridor). It purposely also sits wholly outside land most recently identified to be rezoned for conservation purposes. **Appendix 4** includes a copy of the most recently supplied draft zoning plan from JPG to LMCC, for background purposes, with the road corridor overlaid.

Other than the ecological characteristics and assessment, it is understood that there are no known land characteristics of the land corridor to be added that warrant specific further investigation, nor that would render the inclusion of the additional land for the purpose of concept road connection as proposed, and subject to further part 4 development application and assessment, as unacceptable.

3.4 KEY INVESTIGATIONS

An initial briefing on the modification has been provided to Department of Planning and Environment (DPE) and Lake Macquarie City Council (LMCC). The alignment of the alternate road connection has been modified as a result of initial consultation with Council, in order to provide a more direct linkage with appropriate radii on curves and to exclude any 90 degree bends (where not at an intersection), to better suit the intended function of the road.

No additional consultation has been undertaken with any state agencies, the community or adjoining land owners (other than owner of 'Twine' and 'Thomson' lands). Opportunity for agency consultation and community submissions will occur during the modification assessment process.

This report has been prepared to provide a targeted and succinct environmental assessment of the modification and the environmental consequences that may arise as a result of the changes.

Key matters reported on and investigated include:

- Urban Design and Concept Plan Layout - Road connectivity and linkages;
- Ecological Impact; and
- Other.

4.0 Environmental Consequences

4.1 ROAD CONNECTIVITY AND LINKAGES

It is considered that the alternative local road connection provides the same road connectivity and linkage outcomes within the southern traffic catchment as that intended to be provided by the approved local road connection, and is of similar length and design purpose (being local road, bus route).

The alternative connection is sited within lands under JPG control, connecting lands from to the north and to the south also under JPG control, and will support the provision of linkages that support the functioning and purpose of the new central intersection to the south, being funded by JPG. It will also enable a connected community to be established under JPG control to enable connectivity between the northern and main parts of the southern traffic catchment area.

It is noted that the Concept Plan provides for alternative access to 'Dabson' lands via a road link to Alton Road adjoining the identified and zoned southern local park.

4.2 ECOLOGICAL IMPACT

Appendix 5 includes an ecological assessment of the proposed alternative road corridor, where it traverses the land to be added to the concept plan (ie through the 'Thomson' lands).

The assessment outlines previous field work and biodiversity assessment undertaken and identifies the following ecological characteristics of the road corridor (refer also **Figure 5**):

Figure 5: Vegetation and Significant Flora Map.

- One vegetation community within the road corridor, being Coastal Plains Scribbly Gum Woodland (0.39ha), with the remaining area within the road corridor comprised of managed/cleared land (0.1ha). The native vegetation community is not an Endangered Ecological Community;

- The presence of two threatened flora species within the road corridor, being 11 x *Angophora inopina* and *7 x Tetratheca juncea clumps;* and

- No known hollows, nests or other significant arboreal faunal roosting/denning habitat features, but vegetation forms part of general terrestrial habitat.

The assessment provides information that a referral under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)* has been

made and assessed by the Department of Environment (DoE), who deemed that the proposed action (including clearing for roads as intended partly by this modification, that sit within intended residential zoned lands) was not a controlled action.

The assessment reports on direct impacts (clearing of native vegetation and terrestrial habitat and removal of individual A. inopina species and T. juncea clumps) and indirect impacts (edge effects, exotic species, construction impacts, passing vehicle impacts) arising from the road corridor, as well as key threatening processes. It identifies species that warrant a specific assessment of significance (and provides those), being:

Flora:
- Angophora inopina (Charmhaven Apple);
- Cryptostylis hunteriana (Leafless Tongue Orchid);
- Grevillea parviflora subp. Parviflora (Small Leaf Grevillea); and
- Tetratheca juncea (Black Eye Susan).

Birds:
- Callocephalon fimbriatum (Gang Gang Cockatoo);
- Calyptorhynchus lathami (Glossy Black Cockatoo);
- Daphoenositta chrysoptera (Varied Stitella);
- Glossopsitta pusilla (Little Lorikeet);
- Hieraetus morphnoides (Little Eagle);
- Ninox strenua (Powerful Owl);
- Tyto novaehollandiae (Masked Owl); and
- Tyto tenebricosa (Sooty Owl).

Mammals:
- Petaurus australis (Yellow-bellied Glider);
- Petaurus norfoicensis (Squirrel Glider);
- Mormopterus norfolkensis (Eastern Freetail Bat);
- Miniopterus australis (Little Bentwing Bat);
- Miniopterus schreibersii oceanensis (Eastern Bentwing Bat); and
- Myotis macropus (Southern Myotis).

As considered by the Commonwealth in their assessment of the proposals occurring over the 'Thomson' lands (one component of which includes constructions of roads, the subject of this modification to the concept plan), the site is an addition to other lands controlled by JPG and are generally part of the wider action and the rehabilitation and maintenance of identified neighbouring conservation property, and in that context, the Commonwealth considered the loss arising from developing the land (in full) for residential and infrastructure purposes (apart from the EEC on the lower lying lands) is deemed acceptable without any further offsetting requirements.

Ultimately (and not as part of this minor modification), the 'Thomson' lands can be treated, managed and delivered in a similar fashion to the neighbouring residential development from the concept plan approval, including rehabilitation and maintenance of any future conservation property, either via agreement with LMCC or otherwise, once the identification of conservation zoned lands is finalised by the planning proposal, rather than via an isolated offset package. At the scale of the 'Thomson' land, the threatened flora species and vegetation community will in part be retained outside the proposed road corridor (and future residential lands). At a local scale, significant areas (approx. 120hectares) have already been set aside in perpetuity conservation reserves that contain individuals of the threatened flora species and large patches of similar habitat,

which are subject to a JPG funded multi-million dollar rehabilitation program. In addition to improvements in biodiversity values, ecological resilience and habitat condition, the conservation reserves secure sub-regional and local corridors sought by Council.

Overall, the ecological assessment concludes that the future clearing of the proposed road corridor will not result in a significant impact on threatened species or their habitats and will not place any viable local population at risk of extinction nor the long term survival of those species in the locality.

A number of recommendations are provided to minimise the effect of clearing of 0.39ha of vegetation on site, including pre-clearance survey, staged clearing procedure and general mitigation during construction phase including erosion and sediment control. These can be readily incorporated into future Part 4 applications and development consents which authorise physical works on the land.

4.3 OTHER

It is not considered that the proposed modification, including the addition of land being the proposed road corridor through the 'Thomson' lands, generates any additional environmental consequences of note, that are not otherwise adequately dealt with under either the separate planning proposal or during the course of typical part 4 development assessment.

The additional land for the proposed road corridor:

- Is not mapped nor affected by flooding (which the 1:100 year flood line sitting further south on the 4.5m contour) and will not increase or impact on any downstream flooding, subject to appropriate water cycle management and is of appropriate topography to accommodate the concept road corridor without excessive earthworks outside the nominated corridor.

  ADW Johnson civil and stormwater engineers have advised that:

  > *"Stormwater management planning and modelling for the catchment that includes the road corridor has been previously undertaken, based on an assumption that both the road corridor and land to its west will be developed. Stormwater management basins approved with the utility installation within the 'Thomson' land (DA 714/2014) and currently proposed in an amendment to the 'Twine' consent (DA 1574/2012), have been adequately sized to cater for that part of the road corridor catchment that drains to the south, with stormwater management basins to occur to the north (not yet subject to DA), to be adequately sized to cater for that part of the road corridor catchment that drains to the north.*
  >
  > *Stormwater management, inclusive of that required for the proposed road corridor, has the capacity to limit peak stormwater discharge from the developed Twine and Thomson lands post development to less than or equal to the peak stormwater discharge of the pre developed site, including up to the 100 year ARI storm event. Furthermore, the catchment based system has the capacity to control pollutants discharging from the developed site to meet pollutant reduction requirements.*

Overall, catchment based detention and water quality system that also caters for the proposed road corridor can satisfy Council requirements in relation to stormwater runoff, with those features sited on lands already included within the concept plan area."

As such, it is considered that the proposed alternative road corridor does not generate any additional significant civil, flooding or stormwater consequences, by comparison to the approved concept plan.

- Is mapped as bushfire prone land, but does not, as part of this modification, propose additional residential land.

  The proposed future road provides a desirable permanent local road connection to assist with bushfire planning and management, and can form part of future bushfire management and asset protection system for the urban area. It is understood that the RFS has supported the conversion of part of the land to residential purposes under the separate planning proposal, with bushfire management and asset protection zones to be provided under separate residential development.

  It is considered that the proposed alternative road corridor does not generate any additional significant bushfire management consequences by comparison to the approved concept plan.

- Has been subject to consideration of land suitability considerations such as geotechnical, mine subsidence (the land is not located within a declared Mine Subsidence District), acid sulphate soil potential and management; and consideration of past uses and contamination potential, none of which has resulted in the land (including that of the proposed road corridor) being identified as unsuitable for urban development (including roads as proposed by this specific modification).

  - Cardno Geotech Solutions (CGS) has previously concluded that based on previous field investigations, observations and laboratory results that there is no indication of gross contamination on the site (including the area of the proposed road corridor);

  - CGS has previously advised that preliminary investigation and extensive local experience has not identified any geotechnical constraint that would prohibit the site from development for future residential development (including the area of the proposed road corridor), with further detailed geotechnical assessment to be undertaken for future Part 4 development applications/construction design phases);

  - Whitehead and Associates have previously undertaken a preliminary acid sulphate soils assessment, and have noted that whilst a very small portion of the lower portion of the 'Thomson' lands may contain areas of low probability for acid sulphate soils (ASS), the areas of the site for residential development (including the area of the proposed road corridor) locate north of the ASS risk areas and predominantly in area with no known occurrence of potential ASS. Notwithstanding, detailed ASS assessment was reported as warranted for future Part 4 development applications/construction design phase, and if warranted based on fieldwork and laboratory testing, the development of an ASS Management Plan.

- Has been subject to consideration of Aboriginal heritage. The land is broadly mapped as forming part of a wider sensitive aboriginal landscape area under LMLEP 2014, but does not contain any currently known Aboriginal Heritage items. Specific consideration of aboriginal heritage as part of the planning proposal, under an Aboriginal Heritage Impact Assessment undertaken by RPS Australia East Pty Ltd and in consultation with Registered Aboriginal Parties (RAPs) , has not identified that the land is unsuitable for urban development (which includes roads as proposed by this specific modification), subject to certain recommendations. Due to low ground surface visibility, in addition to legislative recommendations about ceasing works if an unrecorded Aboriginal object/s is identified during future works, cultural recommendations included additional field inspection by a qualified heritage consultant and representatives of the RAP after dense vegetation has been cleared, to allow for identification of any unknown Aboriginal objects.

- There are no additional issues arising from the proposed road corridor that generates environmental consequences that would warrant refusal of the proposed modification, including consideration of visual context, acoustic and odour, landscape, European heritage, nor traffic (refer above relating to local road connectivity within traffic catchments). The land does not sit with the prescribed Coastal Zone.

- The proposal for an alternative road corridor is not considered to be inconsistent with the recently adopted Hunter Region Plan 2036, the NSW 2021 Hunter Regional Action Plan, the now superseded Hunter Regional Plan nor Council's Lifestyle 2030 Strategy.

- Whilst the proposed road corridor is not reliant upon the separate planning proposal and the specific urban/conservation zoning outcome for the 'Thomson' lands, given that zoning is well progressed, it does provide:

    - some guidance to the suitability of the land generally;
    - a context on the expected impacts arising from the proposed road corridor, and;
    - a context on not prejudicing in the interim the objectives of the transitional land use zone, whilst provisioning for road connection that can at the same time, provides a base for orderly development of that land once rezoned and its connection into the wider urban area.

- The proposal for an alternative road corridor does not in itself have any implications specifically for the current state nor local planning agreements.

5.0 Conclusion

Section 75W applies to this application to modify the concept plan approval, under the transitional provisions provided by Clause 3C(1) to Schedule 6A of the EP&A Act.

The power to modify in s75W is significantly different, and broader, compared to the other modification powers that are contained elsewhere in the EP&A Act (such as section 96). Section 75W instead is concerned with consideration of any significant additional impact.

The scope of changes and environmental consequences beyond those which were the subject to the original concept can be looked at in the context of the concept plan approval as a whole.

MP 07_0147 authorises a concept plan that involves the release of up to 2500 low and medium density residential lots, set into a context of environmental conservation and other community and open space lands and an interconnected road network. The proposed changes under this modification will not alter the key principles which form the basis of the concept plan approval nor does it represent a radical transformation of the Concept Approval. The modification adds a minor corridor of additional land to provide an alternative local road connection in one part of the wider urban area (in place of a corridor through other lands excluded from the concept plan and outside JPG control). This outcome is important to enable JPG, who is responsible for delivering the majority of the wider release area and the VPA, to align cumulative lot delivery and infrastructure provision.

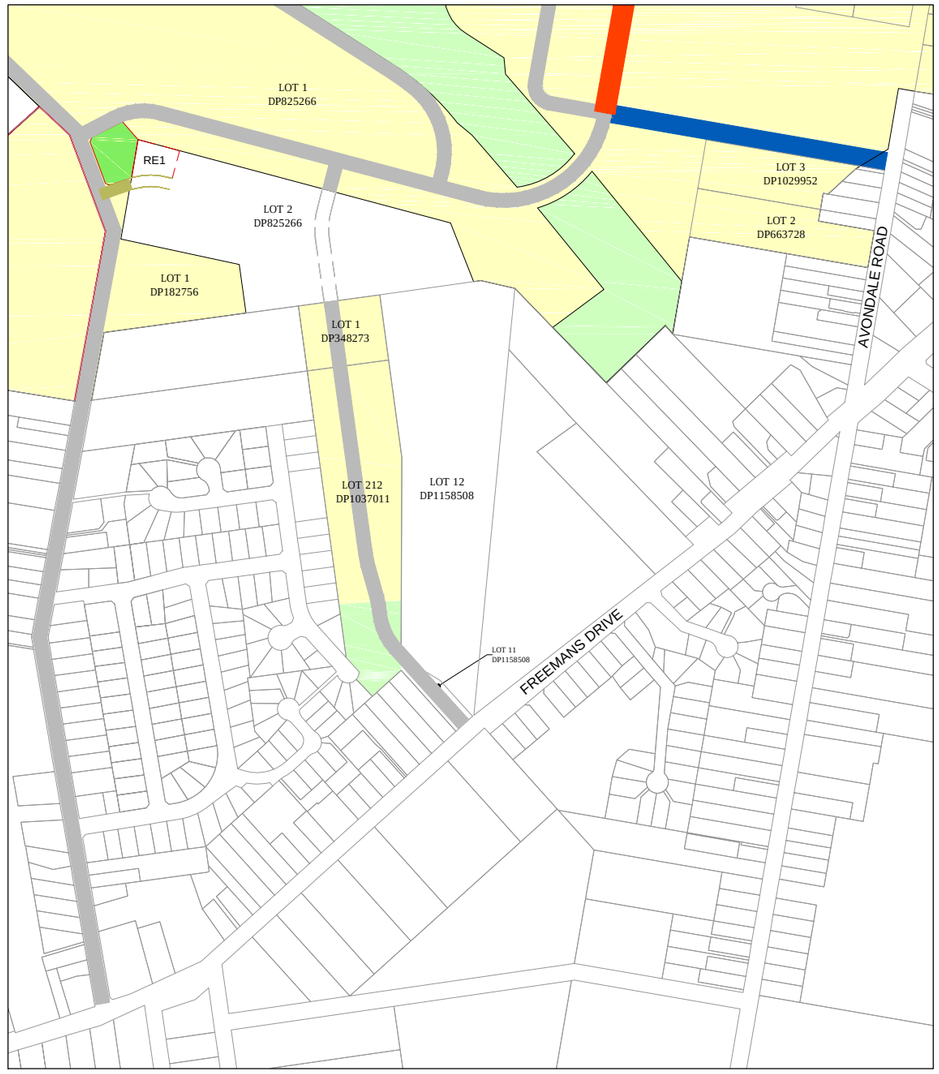
Consideration of the extent of environmental consequences which arise from the modification (to provide an alternative local road connection) beyond those which were the subject to the original assessment is the subject of this assessment. With the support of a specific ecological assessment relating to the road corridor, it is concluded that by comparison to the approved concept, the environmental consequences arising from the modification are not significant, and can be readily supported and appropriately managed.

The modification will facilitate in part the ongoing delivery of the concept plan, notwithstanding land ownership, inclusive of connectivity within the southern traffic catchment and the new central intersection to Freemans Drive, as well as for local based connection between the northern and southern areas of the release area.

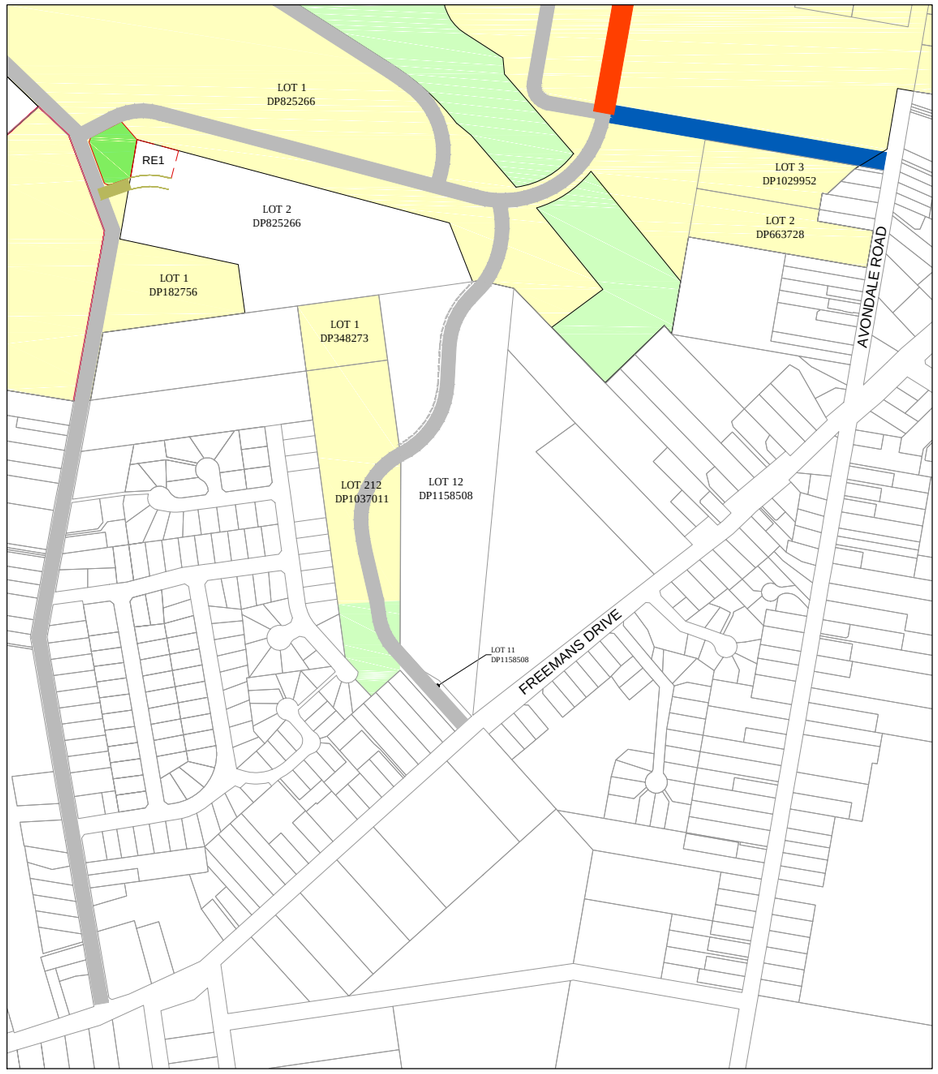
It is considered that inclusive of the modification, the environmental, social and economic benefits to the region identified via Concept Plan approval are not diminished.

Appendix 1

COMPARISON PLAN – APPROVED AND PROPOSED LOCAL ROAD CONNECTION (SOUTHERN)



CURRENT APPROVED MASTERPLAN



PROPOSED MASTERPLAN

ROAD - 25m WIDE

ROAD - 22m WIDE

ROAD - 17m WIDE

ROAD - 14m WIDE

ver.	date	comment	drawn	pm	level information	scale (A3 original size)	notes
D	19.10.16	AMENDED ISSUE	LG	LG	DATUM: N/A CONTOUR INTERVAL: N/A	0 150 300 375m SCALE: 1:7500 (FULL)	

drawing title:

MASTERPLAN MODIFICATION

location: 615, 615c & 617 FREEMANS DRIVE, COORANBONG

council: LMCC

dwg ref: 239078(12)MP-001-D

client: JOHNSON PROPERTY GROUP

adw johnson
central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100

Appendix 2

PROPOSED MODIFIED STRUCTURE PLAN SHOWING ALTERNATIVE LOCAL ROAD CONNECTION AND ADDITIONAL LAND

Appendix C

LAND USE PLAN

NORTH COORANBONG

RESIDENTIAL ESTATE

CONCEPT PLAN 2016

JOHNSON PROPERTY GROUP

(REVISED 19 OCTOBER 2016)

adw johnson

Appendix 3

BACKGROUND – APPROVED UTILITY INSTALLATION ON PART OF 'THOMSON' LANDS

VEGETATION CORRIDOR TO JOIN
TO COUNCIL E2 ZONE LAND

N

119.60

52.7

5m WIDE LANDSCAPE BUFFER

ADDITIONAL VARIABLE WIDTH VEGETATION CORRIDOR

30m WIDE VEGETATION CORRIDOR

61.9

SITE
1.693 ha

144.83

5m WIDE LANDSCAPE BUFFER

47.2

161.77

EXISTING PROPERTY BOUNDARY

5

30

5

RETAINING WALL

STORMWATER BASIN

TEMPORARY ACCESS

103.63

EXISTING PROPERTY BOUNDARY

213.4

EEC

TEMPORARY ACCESS

ver.	date	comment	drawn	pm	level information	scale (A3 original size)
D	10.06.16	UPDATED BASIN LOCATION	ZJ	LG	DATUM: N/A CONTOUR INTERVAL: N/A	0 25 50m SCALE: 1:1000 (FULL)

working beyond expectations

drawing title:

LOCAL WATER CENTRE
LOT LAYOUT

location: 617 FREEMANS DRIVE, COORANBONG

council: LMCC

dwg ref: 239078(12)-SK-009

client:

JOHNSON PROPERTY GROUP

adw johnson
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VEGETATION CORRIDOR TO JOIN
TO COUNCIL E2 ZONE LAND

119.60

RL 14.50
RL 14.50
RL 11.00
RL 11.00
RL 11.00
RL 11.25
RL 9.25
RL 11.00
RL 8.5
RL 7.5
RL 7.5

5m WIDE LANDSCAPE BUFFER

144.83

ADDITIONAL VARIABLE WIDTH VEGETATION CORRIDOR

30m WIDE VEGETATION CORRIDOR

161.77

5

30

5

RETAINING WALL

STORMWATER BASIN

BATTER EXTENTS

103.63

AREA TO BE REHABILITATED AND/OR REVEGETATED UNDER A VEGETATION MANAGEMENT PLAN

MASS PLANTING WITH ENDEMIC SHRUBS & GROUND COVER

EXTENT OF EEC

ver.	date	comment	drawn	pm	level information	scale (A3 original size)
D	10.06.16	UPDATED BASIN LOCATION	ZJ	LG	DATUM: N/A CONTOUR INTERVAL: N/A	0 15.0 30.0m SCALE: 1:600 (FULL)

working beyond expectations

drawing title:

LOCAL WATER CENTRE LAYOUT

location: 617 FREEMANS DRIVE, COORANBONG

council: LMCC

dwg ref: 239078(12)-SK-010

client: JOHNSON PROPERTY GROUP

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• project management • civil engineering • infrastructure • superintendency • economic analysis • social impact • town planning • surveying • development feasibility • visualisation • urban design

VEGETATION CORRIDOR TO JOIN
TO COUNCIL E2 ZONE LAND

119.60

5m WIDE LANDSCAPE BUFFER

144.83

5m WIDE LANDSCAPE BUFFER

ADDITIONAL VARIABLE WIDTH VEGETATION CORRIDOR

30m WIDE VEGETATION CORRIDOR

161.77

RL 14.50
RL 14.50
RL 11.00
RL 11.00
RL 11.00
RL 11.25
RL 9.25
RL 11.00
RL 8.5
RL 7.5
RL 7.5

5

30

5

RETAINING WALL

STORMWATER BASIN

BATTER EXTENTS

AREA TO BE REHABILITATED
AND/OR REVEGETATED UNDER A
VEGETATION MANAGEMENT PLAN

103.63

MASS PLANTING WITH ENDEMIC
SHRUBS & GROUND COVER

EXTENT OF EEC

ver.	date	comment	drawn	pm	level information	scale (A3 original size)
D	10.06.16	UPDATED BASIN LOCATION	ZJ	LG	DATUM: N/A CONTOUR INTERVAL: N/A	0 15.0 30.0m SCALE: 1:600 (FULL)

working beyond expectations

drawing title:

LOCAL WATER CENTRE LAYOUT (AERIAL)

location: 617 FREEMANS DRIVE, COORANBONG

council: LMCC

dwg ref: 239078(12)-SK-011

client: JOHNSON PROPERTY GROUP

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Appendix 4

BACKGROUND – MOST RECENT DRAFT ZONING PLAN RELATING TO 'THOMSON' LANDS

PROPOSED ZONING PLAN

ver.	date	comment	drawn	pm	level information	scale (A3 original size)	notes
A	18.10.16	PRELIMINARY ISSUE	LG	LG	DATUM: N/A CONTOUR INTERVAL: N/A	0 50 100 125m SCALE: 1:2500 (FULL)	

drawing title:

THOMSON ZONING PLAN

location:	615, 615c & 617 FREEMANS DRIVE, COORANBONG
council:	LMCC
dwg ref:	239078(12)-ZON-001-A

client:

JOHNSON PROPERTY GROUP

adw johnson

central coast office ph: (02) 4305 4300
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Appendix 5

ECOLOGICAL ASSESSMENT REPORT OF PROPOSED ALTERNATIVE LOCAL ROAD CONNECTION ON ADDITIONAL LAND

Ecological Assessment

Section 75W Modification to North Cooranbong Residential Estate 'Watagan Park' Concept Approval (07_0147)

Prepared for

Johnson Property Group Pty Ltd

Final / October 2016

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DOCUMENT STATUS

Project Particulars			
Project Name	Ecological Assessment: Lot 12 DP 1158508, 617 Freemans Drive, Cooranbong		
Job Number	16035		
Client	Johnson Property Group Pty Ltd		
Status	Final		
Version	**Date**	**Prepared by**	**Details**
V1	12-10-2016	AC/MD	Draft for client review
V2	18-10-2016	AC/MD	Final for submission

Approval for use:

Matt Doherty - Director

18 October 2016

Disclaimer

This document may only be used for the intended purpose for which it was commissioned by the client in accordance with the contract between MJD Environmental and client. This report has been prepared in response to an agreed scope and based on available data including that supplied by the client. It has been assumed that all supplied information is both accurate and current. This report, results and outcome are accurate at date of production and subject to change over time along with the legislative and policy framework under which it was prepared.

MJD Environmental Pty Limited will not be liable or responsible whatsoever for or in respect of any use of or reliance upon this report and its supporting material by any third party. Unauthorised use of this report in any form whatsoever is prohibited.

EXECUTIVE SUMMARY

MJD Environmental has been engaged by Johnson Property Group Pty Ltd, to prepare an Ecological Assessment to accompany a Section 75W modification of the North Cooranbong Residential Estate 'Watagan Park' Concept Approval (07_0147: 15th Dec 2008) to the NSW Department of Planning and Environment.

The proposed 75W modification entails the provision of an alternate access configuration for the Concept Plan off Freemans Drive through land controlled by Johnson Property Group. The land is known as part Lot 12 DP 1158508, 617 Freemans Drive, Cooranbong, NSW.

The assessment aims to examine the likelihood of the proposed 75W modification having a significant effect on any threatened species, populations or ecological communities listed under the *NSW Threatened Species Conservation Act 1995* (TSC Act). This assessment recognises the relevant requirements of the EP&A Act 1979 as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*.

An EPBC Referral (2014/7315) has been submitted to and approved by the Department of the Environment (DoE). The Minister for the Environment concluded that the proposed action was not a controlled action, and that further assessment and approval under the EPBC Act is not required.

The ecological field assessment found:

- One vegetation community occurred on site being Coastal Plains Scribbly Gum Woodland (0.39ha). The remaining site area comprised Managed/ Cleared land (0.1ha).
- Two threatened flora species were recorded within the site being *Angophora inopina* and *Tetratheca juncea*.
- Two threatened microchiropteran bat species were recorded in the Study Area (Lot 12 DP 1158508) being the Eastern Bentwing-bat (*Miniopterus australis*) and Eastern Freetail-bat (*Mormopterus norfolkensis*).
- Assessment under SEPP 44 found that no 'Potential Koala Habitat' occurs within the Site and no further assessment under SEPP 44 was required.

Ecological impact assessment considered whether the removal of vegetation and cleared areas on site totalling 0.49ha would constitute a significant impact on known threatened species, populations and ecological communities from the locality such that a local extinction may occur. The assessment concluded that the proposal was unlikely to have an impact on the threatened entities assessed.

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GLOSSARY OF TERMS AND ABBREVIATIONS

Term/ Abbreviation	Meaning
Council	Lake Macquarie City Council
DoE	Commonwealth Department of the Environment
DPE	NSW Department of Planning and Environment
DPI Water	NSW Department of Primary Industries – Water
ECA	Watagan Park Environmental Conservation Area
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
ha	hectare
LGA	Local Government Area
LMCC	Lake Macquarie City Council
OEH	NSW Office of Environment and Heritage
TSC Act	NSW Threatened Species Conservation Act 1995

1 Introduction

MJD Environmental has been engaged by Johnson Property Group Pty Ltd, to prepare an Ecological Assessment to accompany a Section 75W modification of the North Cooranbong Residential Estate 'Watagan Park' Concept Approval (07_0147: 15th Dec 2008) to the NSW Department of Planning and Environment.

1.1 Description of Proposal

The proposed 75W modification entails the provision of an alternate access configuration for the Concept Plan off Freemans Drive through land controlled by Johnson Property Group. The land is known as part Lot 12 DP 1158508, 617 Freemans Drive, Cooranbong, NSW, (**Figure 1**). A detailed description of the proposal is contained in the Environmental Assessment Report prepared by ADW Johnson.

Refer to **Appendix 1** for a plan of the proposal.

1.2 Background

The Study Area has been the subject of extensive ecological survey to inform an EIS for the construction and operation of a Local Water Centre (LWC) over part of the Study Area to service Watagan Park. The LWC was approved by the NSW Land and Environment Court on 30th August 2016 (Ref: DA/714/2014). As part of the Court proceedings the expert appointed by JPG, Dr David Robertson of Cumberland Ecology, reviewed all ecological survey and results data including a site inspection and validated the findings as a true and accurate representation of the Study Area's biodiversity.

The ecological investigations have also been utilised to inform a rezoning of the land from RU6 Transition to R2 Residential, SP2 Special Purposes (LWC) and E2 Environmental. The rezoning application is currently under consideration by LMCC. The 75W modification affords due consideration of the proposed land zones, specifically the road alignment will not encroach into areas zoned E2 or SP2 should the rezoning be approved. The rezoning application is currently under consideration by LMCC.

Importantly the 75W modification is not reliant on the proposed rezoning as roads are permitted with consent in the current RU6 zoning.

A Referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) has been made to the Department of the Environment (DoE). The 'action' assessed by DoE and as described under Section 2.1 of the referral is provided below.

The proposal includes a rezoning of the Project Area from the current land zoning being 10 investigation, to Residential (R2) and Environmental (E2) for future residential, infrastructure development and establishment of conservation land on the Project Area. The development will include the construction of residential lots and the Cooranbong Local Water Centre (LWC). The LWC will also be assessed under an Environmental Impact Statement (EIS) lodged with Lake Macquarie City Council (submitted 15 August 2014 – LMCC reference: DA/714/2014).

Overall the proposal representing the action will be treated, managed and delivered as part of the approved North Cooranbong Residential Development (EPBC Ref 2007/3828). The North Cooranbong Residential Development approval was granted under Part 3A of the NSW EP&A Act (1979) in December 2008.

Residential Subdivision and Development

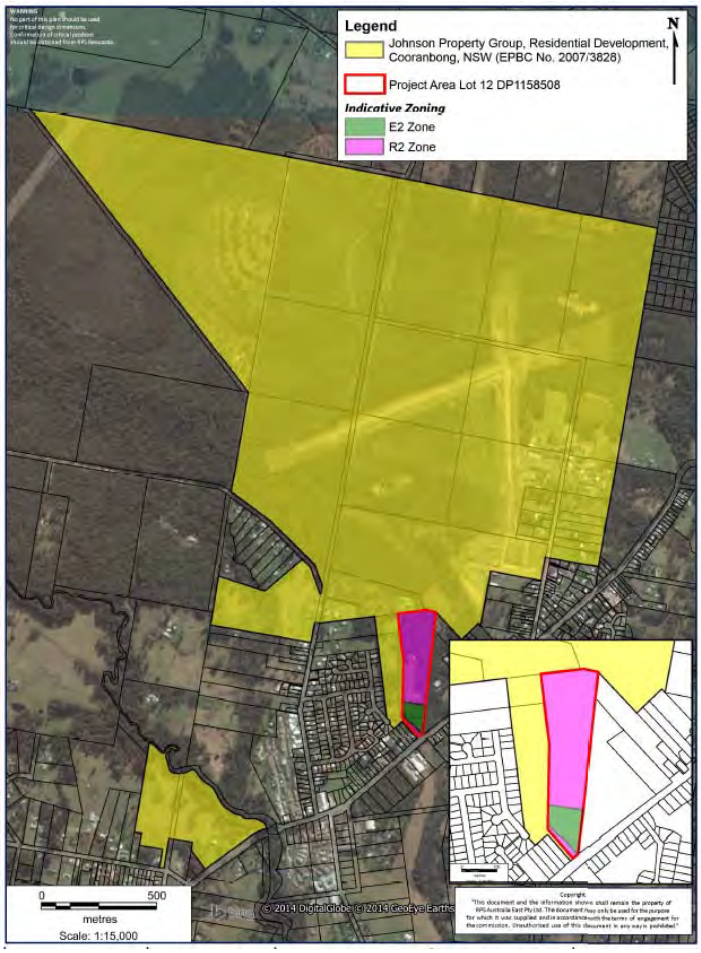
The residential subdivision over the reminder of the R2 lands will include residential lots, services, associated infrastructure and road connections. Dwellings will be constructed on the residential lots under separate applications.

Cooranbong LWC

The Cooranbong LWC will utilise sewage from the North Cooranbong residential area to produce high quality water. The sewage will be treated at the Project Area to provide recycled water plumbed into houses for non-potable uses such as toilet flushing, washing machines, irrigation and car washing, thus reducing potable water demand. The facility, located upon part of Lot 12 DP 1158508, is intended to operate 24 hours, 7 days per week, housed in a low-scale, single level building and associated infrastructure primarily being water tanks, connections and access.

Conservation Land

The vegetation to the south of the Project Area is proposed to be zoned E2 and will be retained as conservation lands. This land will be managed in a similar fashion to the neighbouring conservation property being a Rehabilitation and Maintenance Plan (RaMP) to be delivered under EPBC Approval 2007/3828. The lands subject to the RaMP will be dedicated to Council under the terms set forth in a local planning agreement. The developers offer to Lake Macquarie City Council (LMCC) is to rehabilitate, monitor, manage and transfer this additional conservation land in a similar fashion to the neighbouring conservation property, however this is subject to the agreement of LMCC. If council agrees with this offer then it is proposed to modify the local council planning agreement, which is also registered on title, to enforce this conservation management provision.



Source: RPS (2014c)

The action was considered and assessed by DoE as being part of a wider action for the larger North Cooranbong Residential Estate, known locally as 'Watagan Park'. The Watagan Park action has been assessed and approved under the EPBC Act previously (EPBC Ref 2007/3828).

The Minister for the Environment concluded the proposed action was **not a controlled action**, and on this basis further assessment under the EPBC Act is not required providing activities on site are

generally in accordance with the approved action. Refer to **Appendix 2** for a copy of the EPBC Act Notice of Determination.

Finally, the lead author was involved in the RPS 2014 ecological surveys and reporting both in field and project coordination/ management capacity. Matt Doherty continues in the capacity of consulting ecologist for investigations over the Study Area on behalf of Johnson Property Group, however has moved from RPS to MJD Environmental in February 2016. MJD Environmental team members have been on site on several occasions during 2016.

Matt Doherty is the Environmental Manager appointed by Johnson Property Group, responsible for the implementation of the Rehabilitation and Maintenance Plan (RaMP) for the Watagan Park estate. The RaMP has been approved by the DoE and LMCC for the ecological restoration of the 119.24ha of conservation lands provided under the approved concept plan. Rehabilitation works form part of the VPA with LMCC for the Concept Plan approval. This appointment has been recognised by the DoE and LMCC.

1.3 Aims & Scope

The assessment aims to examine the likelihood of the proposed 75W modification having a significant effect on any threatened species, populations or ecological communities listed under the *NSW Threatened Species Conservation Act 1995* (TSC Act). This assessment recognises the relevant requirements of the EP&A Act 1979 as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*.

The scope of this flora and fauna assessment is to:

- identify vascular plant species occurring within the Site, including any threatened species listed under the TSC Act and/or EPBC Act;
- identify and map the extent of vegetation communities within the Site, including any Endangered Ecological Communities (EEC) listed under the TSC Act or EPBC Act;
- identify any fauna species including; threatened and migratory species, populations or their habitats, occurring within the Site and are known or likely to occur within 10 km of the Site (locality);
- assess the potential of the proposed development to have a significant impact on any threatened species, populations or ecological communities (or their habitats) identified from the Site; and
- describe measures to be implemented to avoid, minimise, manage or monitor potential impacts of the proposal.

Potential impacts associated with the proposal will be considered in the context of the impact area (Site) situated within Lot 12 DP 1158508 (Study Area) and as part of the wider Watagan Project Concept Approval.

1.4 Site Particulars

The following nomenclature has been used in this report (Refer to **Figure 2** Site Context Plan):

- Study Area – Refers to Lot 12 DP 1158508 being 617 Freemans Drive, Cooranbong
- Site – Refers to the 17m road reserve and construction works corridor (20m including road reserve) within the Study Area.

Locality	The Study Area is situated in Cooranbong NSW.
Land Title	Lot 12 DP 1158508
LGA	Lake Macquarie City Council
Area	Study Area – 5.86ha Site – 0.49ha

Zoning	The site is currently zoned RU6 – Transition
Boundaries	The Study Area is situated to the north of Freemans Drive in Cooranbong. Future Watagan Park Estate Concept Plan development areas occur to the west and north-east of the Study Area. Existing rural residential properties occur to the north and east of the Study Area.
Current Land Use	The Study Area contains a dilapidated vacant dwelling and associated ancillary structures. The land is vegetated in the north along the eastern boundary and southern portion. The mid-western portion of the site has been cleared and exists as managed pasture. The Local Water Centre (LWC) exists over the central portion of the land, where the facility and stormwater detention basin will generally be established over the cleared areas and vegetation to the east shall be rehabilitated and conserved. The LWC shall service the Watagan Park Estate.
Topography	The site slopes gently from north to south.

1.5 Qualifications & Licencing

Qualifications

This ecological assessment has been prepared by Matt Doherty and Adam Cavallaro of MJD Environmental Pty Ltd.

Licencing

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101684 (Valid 28 February 2017).
- Animal Research Authority (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2017).
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 16/170) issued by NSW Department of Primary Industries (Valid 8 February 2019).

Figure 1 Site Location

Figure 2 Site Context Plan

2 Methodology

The techniques employed to inform this impact assessment are described in further detail below.

2.1 Desktop Assessment

A review of ecological information was undertaken to provide context and understanding of ecological values occurring on the Study Area. Information reviewed included:

- Online database searches involving a 10 km buffer around the Study Area were undertaken from the NSW Bionet Wildlife Atlas on 13th October 2016. The search provided a current list of potentially occurring threatened species listed under the TSC Act.

Approved documentation for Watagan Park Estate

- Clements, A., Gorrod, E., Rodd, J., Rodd, T. and Wilkins, Sian. (2004) *Flora Assessment: North Cooranbong*. Anne Clements & Associates, North Sydney;
- Smith, A. and Murray. M. (2005) *Cooranbong Aerodrome: Fauna Constraints Assessment*. Austeco, Armidale;
- Clements, A., Baumann, A., Clarke, D., Snowdon R. (2013) *Rehabilitation and Maintenance Plan for the Watagan Park (North Cooranbong development).* Anne Clements & Associates, North Sydney.

Ecological Investigations carried out across the Site and Study Area:

- Cumberland Ecology (2016). *Waldrip – v – Lake Macquarie City Council and Johnson Property Group Pty Ltd - Land and Environment Court Case no. 15/10735 Statement of Evidence.* Prepared for Sparke Helmore Lawyers. February 2016.
- RPS (2014a) *Referral of Proposed Action: Residential Subdivision and Cooranbong Local Water Centre*. RPS Broadmeadow, NSW;
- RPS (2014b) *Flora and Fauna Assessment: Cooranbong Local Water Centre, Lot 12 DP 1158508 Freemans Drive, Cooranbong NSW*. RPS, Broadmeadow, NSW.
- RPS (2014c) *Flora and Fauna Assessment: Rezoning, Lot 12 DP 1158508 Freemans Drive, Cooranbong NSW*. RPS, Broadmeadow, NSW.

2.2 Field Survey

Field survey methodology for the study area has been reviewed and collated from the Flora and Fauna Assessment prepared by RPS (2014c).

Ecological survey works were undertaken in accordance with the LMCC Flora and Fauna Survey Guidelines (2012)

Ecological surveys over the Study Area were undertaken over 14 days by RPS ecologists during late autumn to early spring 2014.

Flora and Fauna Survey effort undertaken by RPS (2014c) has been presented in **Appendix 3**.

2.2.1 Vegetation & Significant Flora Survey

Flora survey methods used by RPS (2014c) were:

- Desktop analysis of regional vegetation mapping data, aerial photography and consideration of historic reports from the area to determine vegetation communities within the study area.
- Establishment of six 20 X 20m vegetation quadrats to assess species presences, distribution and abundance within Study Area.
- Establish eight transects approximately 100m in length. To assess vegetation heterogeneity, identify community boundaries and record species presences within the Study Area.

- Threatened species were identified by using the "Random Mender Technique" described by Cropper (1993). Additionally, targeted surveys were undertaken to assess for cryptic species such as *Tetratheca juncea* during known flowering periods. All threatened species locations were recorded at time of detection.

Based on the vegetation survey the site is considered to represent one stratification unit and is of a simple floristic structure.

Refer to **Figure 3** for Flora Survey Locations undertaken by RPS (2014c). Survey effort

2.2.2 Fauna

Fauna survey methods employed by RPS (2014c) were:

- Targeted surveys for avifauna, arboreal and terrestrial mammals, herpetofauna and microchiropteran bats,
- A survey techniques employed in the study included Elliot trapping, harp trapping, spotlighting, call playback (Owl and Koalas), Anabat recordings, infrared cameras and Opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.).
- Habitat surveys where undertaken to assess for habitat value identification of habitat type that are known to be used by threatened species within the study area.

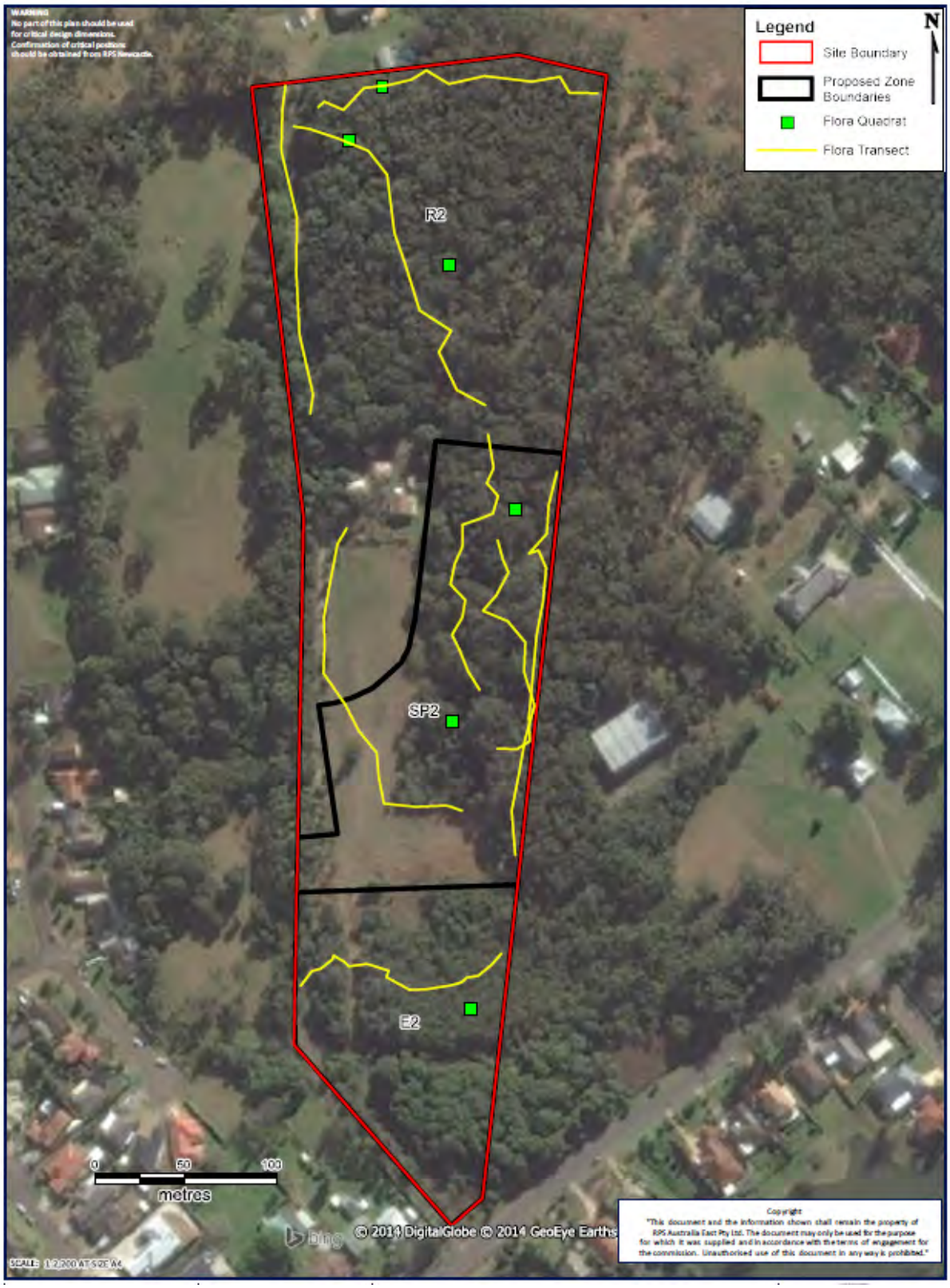
Refer to **Figure 4** for Fauna Survey Locations undertaken by RPS (2014c).

2.2.3 Limitations

The RPS (2014c) survey limitations were:

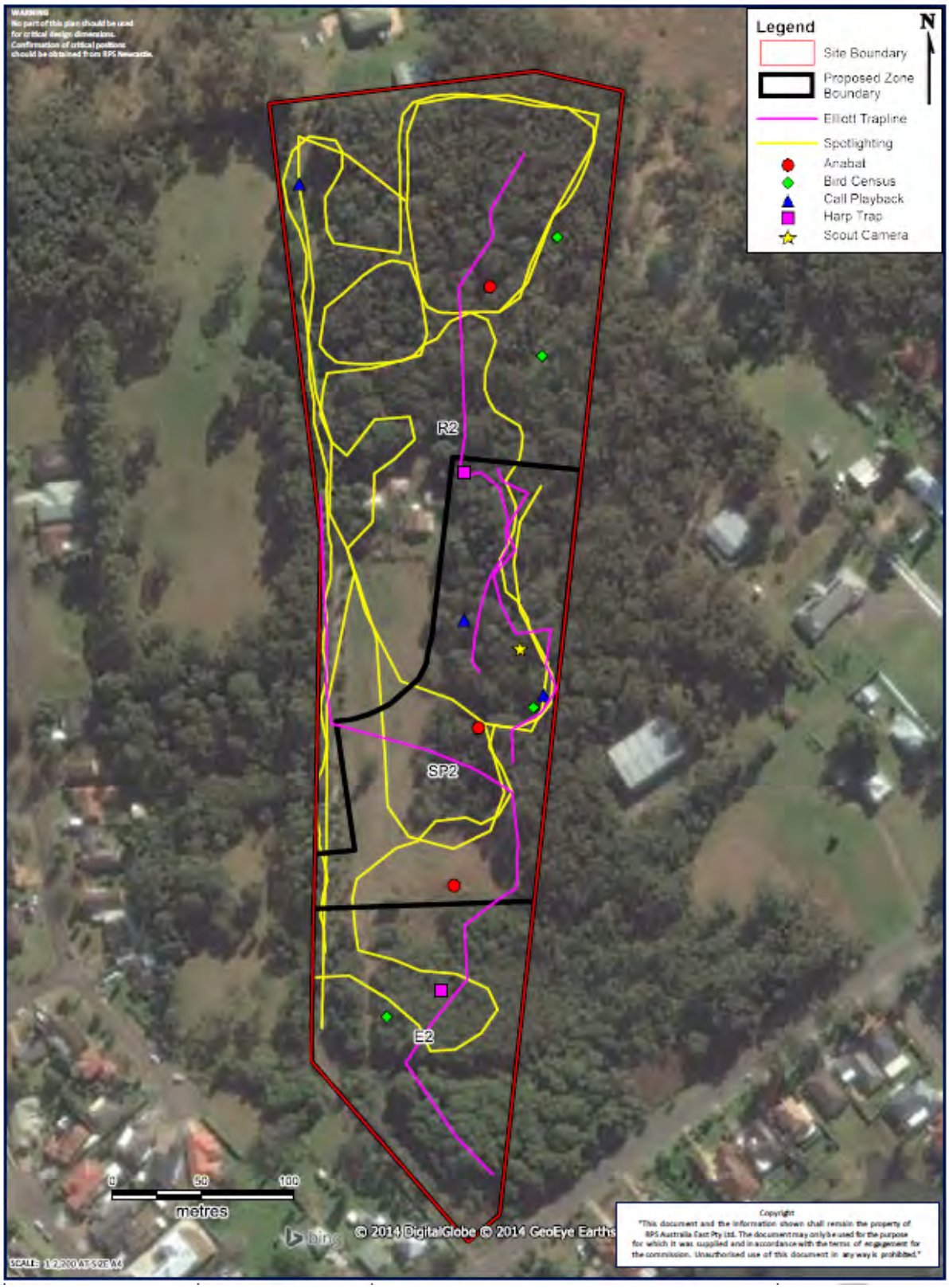
Threatened flora species should be surveyed within their respective flowering periods to ensure accurate identification. The flowering and fruiting plant species that attract some nomadic or migratory threatened species, often fruit or flower in cycles spanning a number of years. Furthermore, these resources might only be accessed in some areas during years when resources more accessible to threatened species fail. As a consequence, threatened species may be absent from some areas where potential habitat exists for extended periods and this might be the case for the above-mentioned opportunistic species. This limitation has been reduced to some extent by the large amount of survey work that has been undertaken throughout the local area, as well as local knowledge of species occurrence.

Figure 3 Flora Survey Locations (RPS 2014c)



Note: Indicative Zone Boundaries area not accurate

Figure 4 Fauna Survey Locations (RPS 2014c)



Note: Indicative Zone Boundaries area not accurate

3 Results

3.1 Desktop Assessment

Using the NSW Wildlife Atlas database BioNet Search (13 October 2016), a list of potentially occurring threatened species and populations from the locality (10 km radius) has been compiled (**Table 1**). A total of 74 entities have been recorded of which 13 threatened flora species and 61 fauna species have been detected to occur within the locality.

Note: Included in **Table 1** below are the numbers of records (not the number of individuals) for each species within the locality taken from the NSW Wildlife Atlas database. It is also noted that due to the terrestrial nature of the site, the 2 marine species recorded within a 10km radius of the Study Area were not considered under this ecological assessment and have not been included in the list.

Table 1 Threatened Flora & Fauna Database Search Results.

Common Name	Scientific Name	TSC Act	No. of Records	Notes & Source
Flora				
Acacia bynoeana	Bynoe's Wattle	E	63	Recorded within 10km of the Site[1]
Angophora inopina	Charmhaven Apple	V	494	Recorded within 10km of the Site[1]
Callistemon linearifolius	Netted Bottle Brush	V	1	Recorded within 10km of the Site[1]
Cryptostylis hunteriana	Leafless Tongue-orchid	E	6	Recorded within 10km of the Site[1]
Eucalyptus parramattensis subsp. *parramattensis*	-	E	4	Recorded within 10km of the Site[1]
Genoplesium insigne	Variable Midge Orchid	E	1	Recorded within 10km of the Site[1]
Grevillea parviflora subsp. *parviflora*	Small-flower Grevillea	V	42	Recorded within 10km of the Site[1]
Maundia triglochinoides	-	V	7	Recorded within 10km of the Site[1]
Melaleuca biconvexa	Biconvex Paperbark	V	206	Recorded within 10km of the Site[1]
Persicaria elatior	Tall Knotweed	V	1	Recorded within 10km of the Site[1]
Rutidosis heterogama	Heath Wrinklewort	V	6	Recorded within 10km of the Site[1]
Syzygium paniculatum	Magenta Lilly Pilly	E	2	Recorded within 10km of the Site[1]
Tetratheca juncea	Black-eyed Susan	V	736	Recorded within 10km of the Site[1]

Common Name	Scientific Name	TSC Act	No. of Records	Notes & Source
Birds				
Anthochaera phrygia	Regent Honeyeater	E	23	Recorded within 10km of the Site[1]
Burhinus grallarius	Bush Stone-curlew	E	1	Recorded within 10km of the Site[1]
Calidris ferruginea	Curlew Sandpiper	E	1	Recorded within 10km of the Site[1]
Callocephalon fimbriatum	Gang-gang Cockatoo	V	34	Recorded within 10km of the Site[1]
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	91	Recorded within 10km of the Site[1]
Chthonicola sagittata	Speckled Warbler	V	1	Recorded within 10km of the Site[1]
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	2	Recorded within 10km of the Site[1]
Daphoenositta chrysoptera	Varied Sittella	V	20	Recorded within 10km of the Site[1]
Ephippiorhynchus asiaticus	Black-necked Stork	E	16	Recorded within 10km of the Site[1]
Epthianura albifrons	White-fronted Chat	V	1	Recorded within 10km of the Site[1]
Erythrotriorchis radiatus	Red Goshawk	E	1	Recorded within 10km of the Site[1]
Falco subniger	Black Falcon	V	1	Recorded within 10km of the Site[1]
Glossopsitta pusilla	Little Lorikeet	V	34	Recorded within 10km of the Site[1]
Haematopus fuliginosus	Sooty Oystercatcher	V	1	Recorded within 10km of the Site[1]
Hieraaetus morphnoides	Little Eagle	V	3	Recorded within 10km of the Site[1]
Ixobrychus flavicollis	Black Bittern	V	2	Recorded within 10km of the Site[1]
Lathamus discolor	Swift Parrot	E	18	Recorded within 10km of the Site[1]
Lophoictinia isura	Square-tailed Kite	V	2	Recorded within 10km of the Site[1]

Common Name	Scientific Name	TSC Act	No. of Records	Notes & Source
Neophema pulchella	Turquoise Parrot	V	4	Recorded within 10km of the Site[1]
Ninox strenua	Powerful Owl	V	37	Recorded within 10km of the Site[1]
Oxyura australis	Blue-billed Duck	V	1	Recorded within 10km of the Site[1]
Pandion cristatus	Eastern Osprey	V	9	Recorded within 10km of the Site[1]
Petroica boodang	Scarlet Robin	V	1	Recorded within 10km of the Site[1]
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	1	Recorded within 10km of the Site[1]
Ptilinopus regina	Rose-crowned Fruit-Dove	V	1	Recorded within 10km of the Site[1]
Ptilinopus superbus	Superb Fruit-Dove	V	1	Recorded within 10km of the Site[1]
Stagonopleura guttata	Diamond Firetail	V	1	Recorded within 10km of the Site[1]
Stictonetta naevosa	Freckled Duck	V	1	Recorded within 10km of the Site[1]
Turnix maculosus	Red-backed Button-quail	V	1	Recorded within 10km of the Site[1]
Tyto novaehollandiae	Masked Owl	V	34	Recorded within 10km of the Site[1]
Tyto tenebricosa	Sooty Owl	V	31	Recorded within 10km of the Site[1]
Mammals				
Dasyurus maculatus	Spotted-tailed Quoll	V	16	Recorded within 10km of the Site[1]
Phascogale tapoatafa	Brush-tailed Phascogale	V	2	Recorded within 10km of the Site[1]
Phascolarctos cinereus	Koala	V	6	Recorded within 10km of the Site[1]
Petaurus australis	Yellow-bellied Glider	V	232	Recorded within 10km of the Site[1]
Petaurus norfolcensis	Squirrel Glider	V	97	Recorded within 10km of the Site[1]

Common Name	Scientific Name	TSC Act	No. of Records	Notes & Source
Potorous tridactylus	Long-nosed Potoroo	V	4	Recorded within 10km of the Site[1]
Macropus parma	Parma Wallaby	V	3	Recorded within 10km of the Site[1]
Petrogale penicillata	Brush-tailed Rock-wallaby	E	4	Recorded within 10km of the Site[1]
Pteropus poliocephalus	Grey-headed Flying-fox	V	78	Recorded within 10km of the Site[1]
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	4	Recorded within 10km of the Site[1]
Mormopterus norfolkensis	Eastern Freetail-bat	V	34	Recorded within 10km of the Site[1]
Chalinolobus dwyeri	Large-eared Pied Bat	V	3	Recorded within 10km of the Site[1]
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	4	Recorded within 10km of the Site[1]
Kerivoula papuensis	Golden-tipped Bat	V	9	Recorded within 10km of the Site[1]
Miniopterus australis	Little Bentwing-bat	V	31	Recorded within 10km of the Site[1]
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V	27	Recorded within 10km of the Site[1]
Myotis macropus	Southern Myotis	V	18	Recorded within 10km of the Site[1]
Scoteanax rueppellii	Greater Broad-nosed Bat	V	25	Recorded within 10km of the Site[1]
Vespadelus troughtoni	Eastern Cave Bat	V	1	Recorded within 10km of the Site[1]
Herpetofauna				
Crinia tinnula	Wallum Froglet	V	16	Recorded within 10km of the Site[1]
Heleioporus australiacus	Giant Burrowing Frog	V	2	Recorded within 10km of the Site[1]
Mixophyes balbus	Stuttering Frog	E	98	Recorded within 10km of the Site[1]
Mixophyes iteratus	Giant Barred Frog	E	42	Recorded within 10km of the Site[1]

Common Name	Scientific Name	TSC Act	No. of Records	Notes & Source
Pseudophryne australis	Red-crowned Toadlet	V	26	Recorded within 10km of the Site[1]
Litoria aurea	Green and Golden Bell Frog	E	1	Recorded within 10km of the Site[1]
Litoria brevipalmata	Green-thighed Frog	V	10	Recorded within 10km of the Site[1]
Litoria littlejohni	Littlejohn's Tree Frog	V	12	Recorded within 10km of the Site[1]
Hoplocephalus stephensii	Stephens' Banded Snake	V	7	Recorded within 10km of the Site[1]

Key:

V = Vulnerable E = Endangered CE = Critically Endangered

1 - *Atlas of NSW Wildlife*, Office of Environment and Heritage (Accessed 13-10-2016).

3.2 Flora Survey

The results provided in this section have been collated from the RPS Flora and Fauna Assessment 2014.

The RPS (2014c) survey recorded:

- 190 flora species of which 143 were native and 47 exotic,
- Three vegetation communities were validated on the Study Area, they were;
    - MU31 Coastal Plains Scribbly Gum Woodland (3.42ha)
    - MU 42 Red Mahogany Apple Paperbark Forest (0.9ha), and
    - Cleared/disturbed Land (1.52ha)

  MU42 Red Mahogany Apple-Paperbark Woodland is commensurate with the TSC ACT listed Endangered Ecological Community *Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*
- Three threatened species were discovered within the Study Area they were
    - *Angophora inopina* (Charmhaven Apple) (listed as vulnerable under the TSC Act and EPBC Act),
    - *Grevillea parviflora* subsp. *parviflora* (Small-leaved Grevillea) (listed as vulnerable under the TSC Act and EPBC Act) and
    - *Tetratheca juncea* (Black Eye Susan) (listed as vulnerable under the TSC Act and EPBC Act).
- 89 individual *A. inopina* trees found in Coastal Plains Scribbly Gum Woodland.
- Four individual *G. parviflora* subsp. *parviflora,* found in Coastal Plains Scribbly Gum Woodland
- 79 clumps *T. juncea* found in Coastal Plains Scribbly Gum Woodland

Of the threatened species recorded within the Study Area the following breakdown is applicable.

Table 2 Threatened Species Breakdown

Area	Count		
	A. inopina	*T. juncea*	*G. parviflora* subsp. *parviflora*
LWC	17	0	4
Site	11	7	0
Study Area (remainder)	61	72	0
Total	**89**	**79**	**4**

Refer to **Figure 5** for a plan showing the vegetation and significant flora of the Study Area.

Figure 5 Vegetation & Significant Flora Map

3.3 Fauna Survey

The results provided in this section have been collated from the RPS Flora and Fauna Assessment 2014.

The RPS (2014c) survey recorded:

- A total of 66 fauna species on the Study Area;
    - 49 bird species,
    - 15 mammal species and
    - 2 frog species.
- Two threatened species were recorded during survey efforts these species were
    - Little Bent-wing Bat (*Miniopterus australis*) and
    - Eastern Freetail Bat (*Mormopterus norfolkensis*).

Both these species were detected via call analysis from Anabat recordings. Both species are listed Vulnerable under the TSC Act. The individuals were recorded on Anabat units set in bushland within the LWC site.

- Remaining species recorded during surveys were commonly found fauna species.
- Three feral species were detected during surveys these were Black Rat (*Rattus rattus*) European Rabbit (*Oryctolagus cuniculus*) and Red Fox (*Vulpis vulpes*).

3.4 Habitat Survey

A summary of RPS (2014) results of the habitat survey across the study area found that three vegetation communities were detected. The vegetation within the Site (proposed road corridor) is restricted to only two of these communities, these being Scribbly Gum Woodland and Cleared/Managed land.

- Scribbly Gum Woodland found to provide suitable habitat for a number of small terrestrial mammals.
- The cleared land also provides suitable forging habitat for macropods and predatory birds.
- The Scribbly Gum Woodland provides habitat for the occurring threatened species *Tetratheca juncea*, *Angophora inopina*, *Grevillea parviflora* subsp. *parviflora* and potential habitat for *Cryptostylis hunteriana*.
- Arboreal habitats were consistent with the locality offering pollen, nectar and vegetative material for arboreal mammal species (e.g. possums and gliders) and resources for avian species. There were no hollows detected, however the Study Area was considered to provide foraging habitat for microbat species. The Study Area was considered to provide foraging habitat within larger home ranges for species such as forest owls and predatory (raptor) bird species. Specialist feeder species habitat was noted such as Allocasuarina species observed on site as a known foraging species for the Glossy-black Cockatoo.
- The site was considered to provide minor faunal movement corridors from north to south, however it was noted that the corridor was severed to the south at Freemans Drive.

4 Impact Assessment

The following section provides an overview of the potential direct, indirect and cumulative impacts associated with the proposal. This overview has been used to inform a likelihood of occurrence and potential for impacts to occur to threatened species, populations and ecological communities. In such instances this has determined the need for further assessment of significance (7-part test).

4.1 Potential Impacts

Based on the ecological survey results over the Study Area, the following direct and indirect impacts have been generated to inform impact assessment over the Site.

Direct Impacts

The Site totals 0.49ha in area and is configured as a linear impact approximately 245m in length and 20m in width. All vegetation within the site will be removed to accommodate the future road and construction zone.

Vegetation

The site contains two vegetation communities that will be removed to accommodate the proposal as follows:

- 0.39ha of Coastal Plains Scribbly Gum Woodland; and
- 0.1ha of Cleared / Managed Land.

Flora

The site contains two of the three threatened species recorded within the Study Area being; *Angophora inopina* and *Tetratheca juncea*. Given that all vegetation shall be removed within the site, this will result in the removal of 11 *A. inopina* individuals and 7 clumps of *T. juncea*.

Fauna

The site will not result in the removal of any known hollows, nests or other significant arboreal faunal roosting/ denning habitat features. The proposal will however, remove all vegetation within the site which shall result in the removal of all terrestrial habitat.

The linear nature of the site will contribute to fragmentation of vegetation to be retained on site. The area of retained vegetation to the east contains the majority of *A. inopina* and *T. juncea* recorded across the Study Area along with intact stands of Costal Plains Scribbly Gum Woodland.

Refer to **Figure 6**.

Indirect Impacts

The proposal may have the following indirect impacts associated with the construction and operation of the road:

- Increased edge effects for each retained vegetated patch;
- Introduction and dispersal of exotic flora species;
- Potential for increased sediment flows during construction if erosion and nutrient control devices are not installed to industry best practice and maintained for the duration of construction / soil stabilisation works;
- Light shine from the passing vehicles; and
- Fauna strike from passing vehicles.

Figure 6 Vegetation and Threatened Species Outcome

4.2 Threatened Species & Communities Likelihood of Occurrence Assessment

Threatened flora and fauna species (listed under the TSC Act) that have been gazetted and recorded within a 10 kilometres radius of the Site have been considered within the assessment contained in **Table 3**. Each species / community is considered for its likelihood to occur on the Site and potential for impact arising from the proposal. Where a potential for impact is considered the entity has been nominated for further assessment under an Assessment of Significance (AoS) in **Appendix 5**.

'**Species / Community**' – Lists each threatened species / EEC known from the locality (10 km radius). The status and number of records along with source and notes for each threatened entity under the TSC Act is also provided.

'**Habitat / Species Descriptions**' – for up to date threatened species profiles including habitat descriptions and other key ecological information reference is made to the following online resources:

- NSW OEH Threatened Species Profile Search - http://www.environment.nsw.gov.au/threatenedSpeciesApp/
- Commonwealth Biodiversity: Species Profile and Threats Database (SPRAT) - http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

'**Likelihood of Occurrence on Site**' – Assesses the likelihood of each locally recorded species and EEC to occur within the Site, using knowledge of each species' habitat and lifecycle requirements and with regard the habitat types present within the Site, results of the literature review and database searches and field investigations. The location and number of records of the species (OEH Atlas of NSW Wildlife) were also considered in determining probability of occurrence.

'**Potential for Impact**' – Assesses the likelihood of impacts to each species / community that would result from the proposed development, taking into account direct and indirect short and long-term impacts.

Database searches were conducted of the NSW Wildlife Atlas (13-10-2016).

Note: marine species (bird, reptile, fish, mammal) recorded on the Protected Matters have not been listed or assessed herewith.

Table 3 Likelihood of Occurrence and Impact Assessment

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
Flora				
Acacia bynoeana	Bynoe's Wattle	E	63	This species was **not recorded** on site during targeted threatened species surveys. This species is known to occur in association with vegetation that contains Scribbly Gum, which is found within the Study Area. Its cryptic nature and the occurrence of suitable habitat gives it the **potential** to occur on site. Given the absence of records during targeted surveys coupled with the minor area of clearing within the site it is considered **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Angophora inopina	Charmhaven Apple	V	494	This species was **recorded** on site. An AoS has been applied in **Appendix 5.**
Callistemon linearifolius	Netted Bottle Brush	V	1	This species was **not recorded** on site. This species is known to occur in association with dry sclerophyll forest, similar to vegetation found within the Study Area. Targeted threatened species surveys within the habitat of this species did not result in recording this species on site. This species is unlikely to occur and as such **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Cryptostylis hunteriana	Leafless Tongue-orchid	E	6	This species was **not recorded** on site during targeted threatened species surveys. The survey was undertaken outside of this species optimal flowering time (Nov-Dec). This species is known to occur in association with vegetation that contains Scribbly Gum, which is found within the Study Area. Its cryptic nature and suitable habitat gives it the **potential** to occur on site and **may** be impacted by the proposal An AoS has been applied in **Appendix 5**.
Eucalyptus parramattensis subsp. *parramattensis*	-	E	4	This species was **not recorded** on site. There is no suitable habitat (sandy soils on low damp sites) found within the site. This species is unlikely to occur and as such **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Genoplesium insigne	Variable Midge Orchid	E	1	This species was **not recorded** on site during targeted threatened species surveys. The survey was undertaken outside of this species optimal flowering time (Sept-Oct). This species is known to occur in association with vegetation that contains Scribbly Gum, which is found within the study area. Its cryptic nature and suitable habitat gives it the **potential** to occur on site, however the paucity of records coupled with the minor area of clearing proposed in the Study Area, it is considered **unlikely** to be impacted by the proposal.

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
				An AoS is not required for this species.
Grevillea parviflora subsp. *parviflora*	Small-flower Grevillea	V	42	This species was **recorded** on the Study Area. An AoS has been applied in **Appendix 5**.
Maundia triglochinoides	-	V	7	This species was **not recorded** on site. There is no suitable habitat (swamps, lagoons, dams, channels, creeks or shallow freshwater 30 - 60 cm deep on heavy clay) found within the site. There is a riparian area situated in the south of the Study Area, however the proposal does not have any relationship with this area. Furthermore, the approved LWC is situated between the site and only representation of habitat on site for this species. Notwithstanding the buffer this provides in its current undeveloped form, the LWC when developed will rehabilitate vegetated areas to the east and provide a detention basin to the south of the facility which will work to afford additional protection to the riparian environment. On this basis it is considered **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Melaleuca biconvexa	Biconvex Paperbark	V	206	This species was **not recorded** on site. There is no suitable habitat (poorly drained areas and adjacent watercourses) found within the site. There is a riparian area situated in the south of the Study Area that may contain suitable habitat for this species, however the proposal does not have any relationship with this area. Furthermore, the approved LWC is situated between the site and only representation of habitat on site for this species. Notwithstanding the buffer this provides in its current undeveloped form, the LWC when developed will rehabilitate vegetated areas to the east and provide a detention basin to the south of the facility which will work to afford additional protection to the riparian environment. On this basis it is considered **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Persicaria elatior	Tall Knotweed	V	1	This species was **not recorded** on site. There is no suitable habitat (damp places, especially beside streams and lakes). There is a riparian area situated in the south of the Study Area that may contain suitable habitat for this species, however the proposal does not have any relationship with this area. Furthermore, the approved LWC is situated between the site and only representation of habitat on site for this species. Notwithstanding the buffer this provides in its current undeveloped form, the LWC when developed will rehabilitate vegetated areas to the east and provide a detention basin to the south of the facility which will work to afford additional protection to the riparian environment. On this basis it is considered **unlikely** to be impacted by the proposal. An AoS is not required for this species.

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
Rutidosis heterogama	Heath Wrinklewort	V	6	This species was **not recorded** on site during targeted threatened species surveys. This species is known to occur in heath on sandy soils and moist areas in open forest. The lack of suitable habitat on site suggests presence of this species is highly unlikely to occur and therefore **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Syzygium paniculatum	Magenta Lilly Pilly	E	2	This species was **not recorded** on site. There is no suitable habitat (Rainforest) found within the Study Area. This species is unlikely to occur and as such **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Tetratheca juncea	Black-eyed Susan	V	736	This species was **recorded** on site. An AoS has been applied in **Appendix 5**.
Birds				
Anthochaera phrygia	Regent Honeyeater	E	23	This species was **not recorded** on site during targeted threatened species surveys. This species is known to forage on *Eucalyptus robusta* during winter migrations, which is not found in vegetation on the site. This species is found in the riparian vegetation situated in the south of the Study Area that provide suitable foraging habitat for this species, however the proposal does not have any direct relationship with this area. Furthermore, the approved LWC is situated between the site and only representation of habitat on site for this species. Notwithstanding the buffer this provides in its current undeveloped form, the LWC when developed will rehabilitate vegetated areas to the east and provide a detention basin to the south of the facility which will work to afford additional protection to the riparian environment. On this basis it is considered **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Burhinus grallarius	Bush Stone-curlew	E	1	This species was **not recorded** on site during targeted threatened species surveys. This species is known inhabit woodlands which are found on site but require an open grassy understorey. The vegetation within the project is woodland with a dense heathy understorey The lack of suitable understorey vegetation coupled with the paucity of records within a 10km buffer of the study area means it is unlikely to occur in the site and it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Calidris ferruginea	Curlew Sandpiper	E	1	This species was **not recorded** on site. There is no suitable habitat (intertidal mud flats in estuaries, bays, lakes and lagoons) found within the site. On this basis the species is unlikely to occur and as such **unlikely** to be impacted by the proposal. An AoS is not required for this species.

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
Callocephalon fimbriatum	Gang-gang Cockatoo	V	34	This species was **not recorded** on site during targeted threatened species surveys. This species is known inhabit tall mountain forest in the summer and lower altitudes in the winter within drier woodlands, they also require hollows for nesting. The vegetation within the site represents potential foraging habitat, however is lacking hollows. Given the potential foraging habitat the species is considered to have **potential** to utilise the site as part of a wider home range. Based on the potential occurrence of this species an AoS has been applied in **Appendix 5**.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	91	This species was **not recorded** on site during targeted threatened species surveys. This species is known to forage on *Allocasuarina* cones of which this genus is present on site This coupled with the 91 records found in the 10km buffer search of the study area, means this species has the **potential** to occur on the Site/ Study Area. On this basis an AoS has been applied in **Appendix 5**.
Chthonicola sagittata	Speckled Warbler	V	1	This species was **not recorded** on site during targeted threatened species surveys. This species is known to inhabit forest and woodlands which are found on site however require an open grassy understorey generally on rocky ridges or gullies. The vegetation within the site comprises woodland with a dense heath understorey. The lack of suitable understorey habitat coupled with only one record within a 10km search of the study site means it is unlikely to occur on the site and it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	2	This species was **not recorded** on site during targeted threatened species surveys. This species is known to inhabit drier forests and woodlands lacking dense understorey. The vegetation within the project site is woodland with a dense heath understorey. The lack of suitable understorey vegetation coupled with only two record within a 10km search of the study area means it is unlikely to occur in the area and it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Daphoenositta chrysoptera	Varied Sittella	V	20	This species was **not recorded** on site during targeted threatened species surveys. This species is known to inhabit eucalypt forests and woodlands especially those contain rough-bark and mature smooth bark gums with dead branches. The preferred vegetation type found on site, coupled with the 20 records found in the 10km search of the study area, means the Varied Sittella has the **potential** to occur on site. On this basis an AoS has been applied in **Appendix 5**.
Ephippiorhynchus asiaticus	Black-necked Stork	E	16	This species was **not recorded** on site. There is no suitable habitat (floodplain wetlands of major coastal rivers, minor flood plain, coastal sandplain wetlands and estuaries) found within the site. This species is unlikely to occur and as such **unlikely** to be impacted by the proposal.

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
				An AoS is not required for this species.
Epthianura albifrons	White-fronted Chat	V	1	This species was **not recorded** on site. There is no suitable habitat (saline environment-estuaries and salt marsh) found within the site. This species is unlikely to occur and as such **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Erythrotriorchis radiatus	Red Goshawk	E	1	This species was **not recorded** on site. There is no suitable habitat (Sub-tropical Rainforest and Melaleuca Swamp Forest) found within the site. This species is unlikely to occur and as such **unlikely** to be impacted by the proposal. An AoS is not required for this species
Falco subniger	Black Falcon	V	1	This species was **not recorded** on site. This species is mainly found in inland environments. Thus coupled with only one record within a 10km search of the Study Area, it is considered unlikely to occur on or frequent the site and is therefore **unlikely** to be impacted by the proposal. An AoS is not required for this species
Glossopsitta pusilla	Little Lorikeet	V	34	This species was **not recorded** on site. It is known to forage in canopy of eucalyptus forest and woodland of which occurs on site. This species has 34 records within a 10km search of the Study Area. On this basis this species has the potential to occur within the habitats on site. On this basis an AoS has been applied in **Appendix 5.**
Haematopus fuliginosus	Sooty Oystercatcher	V	1	This species was **not recorded** on site. There is no suitable habitat (estuarine environment) found within the project site, coupled with only one record within a 10km search of the study site means it is unlikely to occur in the area and it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Hieraaetus morphnoides	Little Eagle	V	3	This species was **not recorded** on site. This species found throughout Australia in various open Woodland and Forest vegetation communities. Although this species has only three records within a 10km search of the Study Area, its large distribution and varied preferred habitat results in it having a potential to occur on site. On this basis an AoS has been applied in **Appendix 5.**
Ixobrychus flavicollis	Black Bittern	V	2	This species was **not recorded** on site. There is no suitable habitat (terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation) found within the site. Based on the absence of preferred habitat for this species, it is considered **unlikely** that the Black Bittern would occur on site. On this basis it is considered unlikely to be impacted by the proposal. An AoS is not required for this species

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
Lathamus discolor	Swift Parrot	E	18	This species was **not recorded** on site during targeted threatened species surveys. This species is known to forage on *Eucalyptus robusta* during winter migrations, which is not found in vegetation on the site. This species is found in the riparian vegetation situated in the south of the Study Area that provide suitable foraging habitat for this species, however the proposal does not have any direct relationship with this area. Furthermore, the approved LWC is situated between the site and only representation of habitat on site for this species. Notwithstanding the buffer this provides in its current undeveloped form, the LWC when developed will rehabilitate vegetated areas to the east and provide a detention basin to the south of the facility which will work to afford additional protection to the riparian environment. On this basis it is considered **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Lophoictinia isura	Square-tailed Kite	V	2	This species was **not recorded** on site. There is no suitable habitat found within the site (woodland adjacent to watercourses). Thus coupled with only two record within a 10km search of the site, it is unlikely to occur in the area and it is **unlikely** to be impacted by the proposal. An AoS is not required for this species
Neophema pulchella	Turquoise Parrot	V	4	This species was **not recorded** on site. There is potential habitat found within the site (woodland and disturbed grassland). On the basis there is relatively few records in the area it is considered unlikely to occur on site and it is therefore **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Ninox strenua	Powerful Owl	V	37	This species was **not recorded** on site. Prey species in the form of small mammals, were detected during field surveys across the Study Area. No large hollows were observed on site. The large number of records in the 10km search of the study site and suitable forging for this species, means it has **potential** to occur on site as part of its wider home range. On this basis an AoS has been applied in **Appendix 5.**
Oxyura australis	Blue-billed Duck	V	1	This species was **not recorded** on site. There is no suitable habitat found within the site (large water bodies) for the Blue-billed Duck. Given the lack of suitable habitat for this species coupled with the paucity of records within a 10km search of the Study Area, it is unlikely the species shall occur on site and therefore considered **unlikely** to be impacted by the proposal. An AoS is not required for this species
Pandion cristatus	Eastern Osprey	V	9	This species was **not recorded** on site. There is no suitable habitat found within the site (coastal environments -shorelines, reefs and open water) for this species.

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
				Therefore, it is unlikely to occur the Osprey would frequent the site, thus **unlikely** to be impacted by the proposal. An AoS is not required for this species
Petroica boodang	Scarlet Robin	V	1	This species was **not recorded** on site. There is no suitable habitat found within the site (western inland woodland environments) for this species. On this basis it is considered unlikely to occur on site and therefore **unlikely** to be impacted by the proposal. An AoS is not required for this species
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	1	This species was **not recorded** on site. There is no preferred habitat such as open box -gum woodlands with a grassy understorey. Notwithstanding the paucity of records in the locality (10km radius from the Study Area), the Babbler is unlikely to occur on site and therefore considered **unlikely** to be impacted by the proposal. An AoS is not required for this species
Ptilinopus regina	Rose-crowned Fruit-Dove	V	1	This species was **not recorded** on site. There is no suitable habitat (Rainforest) found within the site. This species is unlikely to occur and as such **unlikely** to be impacted by the proposal. An AoS is not required for this species
Ptilinopus superbus	Superb Fruit-Dove	V	1	This species was **not recorded** on site. There is no suitable habitat (Rainforest) found within the site. This species is unlikely to occur and as such **unlikely** to be impacted by the proposal An AoS is not required for this species
Stagonopleura guttata	Diamond Firetail	V	1	This species was **not recorded** on site. There is no suitable habitat found within the project (western inland woodland environments). Notwithstanding the paucity of records in the locality (10km radius from the Study Area), the species is unlikely to occur on site and therefore considered **unlikely** to be impacted by the proposal. An AoS is not required for this species
Stictonetta naevosa	Freckled Duck	V	1	This species was **not recorded** on site. There is no suitable habitat (permanent water bodies) found within the site. This species is unlikely to occur and as such **unlikely** to be impacted by the proposal. An AoS is not required for this species
Turnix maculosus	Red-backed Button-quail	V	1	This species was **not recorded** on site during targeted threatened species surveys. This species is known to inhabit open woodlands with an open grassy understorey preferably close to water. The vegetation within the site is described as woodland with a dense heath understorey. The lack of suitable understorey vegetation and absence

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
				of a standing/ running water source means it is unlikely to occur on site and it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Tyto novaehollandiae	Masked Owl	V	34	This species was **not recorded** on site. Prey species in the form of small mammals, were detected during field surveys across the Study Area. No large hollows were observed on site. The large number of records in the 10km search of the study site and suitable forging for this species, means it has **potential** to occur on site as part of its wider home range. On this basis an AoS has been applied in **Appendix 5.**
Tyto tenebricosa	Sooty Owl	V	31	This species was **not recorded** on site. Prey species in the form of small mammals, were detected during field surveys across the Study Area. No large hollows were observed on site. The large number of records in the 10km search of the study site and suitable forging for this species, means it has **potential** to occur on site as part of its wider home range. On this basis an AoS has been applied in **Appendix 5.**
Mammals				
Dasyurus maculatus	Spotted-tailed Quoll	V	16	This species was **not recorded** on site. The Quoll is known to inhabit a range of vegetation types that include woodland and heath, of which both are found on site. Prey species in the form of small mammals, that were detected during survey efforts. No large hollows, caves or rock outcrops were observed on site. The proximity to urban development and the narrow connections to large areas of forest mean it is unlikely to occur in the area and it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Phascogale tapoatafa	Brush-tailed Phascogale	V	2	This species was **not recorded** on site. There is a lack of suitable denning habitat as this species requires many different hollows over a short time span. Suboptimal foraging habitat occurs for this species on site. This species is considered unlikely to occur and as such **unlikely** to be impacted by the proposal. An AoS is not required for this species
Phascolarctos cinereus	Koala	V	6	This species was **not recorded** on site. A SEPP 44 assessment determined that one Koala feed tree species listed under schedule 2 of the SEPP occurred on site, however at no point did it occur at a density of 15% or greater (refer to **Section 4.3.2**). Furthermore, field surveys did not record the presence of any individuals or secondary indications cross the Study Area. On this basis it is considered unlikely that Koalas would occur on site and therefore **unlikely** to be impacted by the proposal. An AoS is not required for this species
Petaurus australis	Yellow-bellied Glider	V	232	This species was **not recorded** on site. There is preferred forging species (Eucalypt) found within the site. This species has been recorded in high numbers within a 10km

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
				search of the Study Area thus, **potential** to occur on site cannot be discounted. On this basis An AoS has been applied in **Appendix 5.**
Petaurus norfolcensis	Squirrel Glider	V	97	This species was **not recorded** on site. There is preferred forging species (Eucalypt) found within the site. This species has been recorded in high numbers within a 10km search of the Study Area thus, **potential** to occur on site cannot be discounted. On this basis An AoS has been applied in **Appendix 5.**
Potorous tridactylus	Long-nosed Potoroo	V	4	This species was **not recorded** on site. There is no preferred habitat (rainforest, wet sclerophyll forest) found within the site. On this basis, this species is considered unlikely to occur and as such **unlikely** to be impacted by the proposal. An AoS is not required for this species
Macropus parma	Parma Wallaby	V	3	This species was **not recorded** on site. Furthermore, there is no preferred habitat (rainforest, wet sclerophyll forest) found within the site. This species is considered unlikely to occur on site and therefore **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Petrogale penicillata	Brush-tailed Rock-wallaby	E	4	This species was **not recorded** on site. There is no preferred habitat (rocky outcrops) existing within the Site or wider Study Area. This species is unlikely to occur and as such **unlikely** to be impacted by the proposal. An AoS is not required for this species
Pteropus poliocephalus	Grey-headed Flying-fox	V	78	This species was **not recorded** on site during the field survey period. The site does not contain a permanent or temporary camp for this species. No seasonal foraging habitat occurs on the site such as winter flowing blossom. On this basis it is **unlikely** the species will be impacted by the proposal. An AoS is not required for this species
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	4	This species was **not recorded** on site. The site does not contain any denning habitat (hollows) for this species. Marginal foraging habitat is present across the site and study area. Considering the minor area of clearing coupled with the paucity of records from the locality, it is unlikely this species would occur on site. On this basis, it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Mormopterus norfolkensis	Eastern Freetail-bat	V	34	This species was **recorded** on the Study Area. An AoS has been applied in **Appendix 5.**
Chalinolobus dwyeri	Large-eared Pied Bat	V	3	This species was **not recorded** on site. There is no preferred habitat (caves or roosting structures) found within the site. The site contains foraging habitat is present across the site and study area. Considering the minor area of clearing coupled with

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
				the paucity of records from the locality, it is unlikely this species would occur on site. On this basis, it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	4	This species was **not recorded** on site. The site does not contain any denning habitat (hollows) for this species. Marginal foraging habitat is present across the site and study area. Considering the minor area of clearing coupled with the paucity of records from the locality, it is unlikely this species would occur on site. On this basis, it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Kerivoula papuensis	Golden-tipped Bat	V	9	This species was **not recorded** on site. There is no preferred habitat (wet or dry sclerophyll forest adjacent to rainforest) found within the site. The site does not contain suitable roosting or denning habitat for this species. On this basis the Golden-tipped Bat is considered unlikely to occur on site and therefore is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Miniopterus australis	Little Bentwing-bat	V	31	This species was **recorded** on site. An AoS has been applied in **Appendix 5.**
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V	27	This species was **not recorded** on site. There are 27 records found within the 10km search of the study area and the Anabat analysis report provided in RPS (2104c) state this species has **potential** to occur. Therefore, an AoS has been applied in Appendix 5
Myotis macropus	Southern Myotis	V	18	This species was **not recorded** on site. There are 18 records found within the 10km search of the study area and the Anabat analysis report provided in RPS (2104c) state this species has **potential** to occur. Therefore, an AoS has been applied in **Appendix 5.**
Scoteanax rueppellii	Greater Broad-nosed Bat	V	25	This species was **not recorded** on site. There is no preferred habitat (wet Sclerophyll forest or moist gullies) found within the site. Suitable habitat occurs in the south of the Study Area however is absent in the site. On this basis the species is unlikely to frequent the site due to the absence preferred habitat and as such it is considered **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Vespadelus troughtoni	Eastern Cave Bat	V	1	This species was **not recorded** on site. There is no preferred foraging or roost habitat (wet sclerophyll forest and tropical woodlands) found within the site. Considering the minor area of clearing coupled with the paucity of records from the locality, it is

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
				unlikely this species would occur on site. On this basis, it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Herpetofauna				
Crinia tinnula	Wallum Froglet	V	16	This species was **not recorded** on site. There is no suitable habitat (riparian forest) found within the site. On this basis, the Wallum Froglet is unlikely to occur on site and therefore **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Heleioporus australiacus	Giant Burrowing Frog	V	2	This species was **not recorded** on site. There is no suitable habitat (Hawkesbury Sandstone/ sandstone ridges or plateaus) found within the site. On this basis, the species is unlikely to occur on site and therefore **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Mixophyes balbus	Stuttering Frog	E	98	This species was **not recorded** on site. There is no suitable habitat (wet sclerophyll forest, moist gullies or rainforests) found within the site. This species is unlikely to occur on site thus is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Mixophyes iteratus	Giant Barred Frog	E	42	This species was **not recorded** on site. There is no suitable habitat (wet sclerophyll forest, moist gullies or rainforests) found within the site. This species is unlikely to occur on site and therefore **unlikely** to be impacted by the proposal. An AoS is not required for this species
Pseudophryne australis	Red-crowned Toadlet	V	26	This species was **not recorded** on site. There is no suitable habitat (open forest on Hawkesbury and Narrabeen sandstones) found within the site. On this basis this species is considered unlikely to occur on site and therefore **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Litoria aurea	Green and Golden Bell Frog	E	1	This species was **not recorded** on site. There is no suitable habitat for this species on site. On this basis, the Green and Golden Bell Frog is unlikely to occur on site and therefore **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Litoria brevipalmata	Green-thighed Frog	V	10	This species was **not recorded** on site. There is no suitable habitat (aquatic environments such as swamps streams, lagoons and wetlands) found within the site. Thus, it is unlikely to occur on site and therefore **unlikely** to be impacted by the proposal.

Common Name	Scientific Name	TSC Act	No. of Records	Likelihood of Occurrence / Likely Level of Impact
				An AoS is not required for this species.
Litoria littlejohni	Littlejohn's Tree Frog	V	12	This species was **not recorded** on site. There is no suitable habitat (aquatic environments such as rocky creeks and heavily vegetated streams) found within the site. On this basis, this species is unlikely to occur on site and it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.
Hoplocephalus stephensii	Stephens' Banded Snake	V	7	This species was **not recorded** on site during field surveys. There is no suitable habitat (Sandstones of the Hawkesbury, Narellan and Shoalhaven formations) found within the site. Therefore it is unlikely to occur on site and it is **unlikely** to be impacted by the proposal. An AoS is not required for this species.

Key:

V = Vulnerable E = Endangered CE = Critically Endangered

The following species are being assessed in **Appendix 5** under the 7 Part Test of Significance (TSC Act) based on the likelihood of occurrence results contained in **Table 3**.

Flora

- *Angophora inopina* Charmhaven Apple
- *Cryptostylis hunteriana* Leafless Tongue Orchid
- *Grevillea parviflora* subsp. *parviflora* Small Leaf Grevillea
- *Tetratheca juncea* Black Eye Susan

Fauna

- *Callocephalon fimbriatum* Gang-gang Cockatoo
- *Calyptorhynchus lathami* Glossy-Black Cockatoos
- *Daphoenositta chrysoptera* Varied Sittella
- *Glossopsitta pusilla* Little Lorikeet
- *Hieraaetus morphnoides* Little Eagle
- *Ninox strenua* Powerful Owl
- *Tyto novaehollandiae* Masked Owl
- *Tyto tenebricosa* Sooty Owl
- *Petaurus australis* Yellow Bellied Glider
- *Petaurus norfolcensis* Squirrel Glider
- *Mormopterus norfolkensis* Eastern Freetail Bat
- *Miniopterus australis* Little Bentwing-bat
- *Miniopterus schreibersii oceanensis* Eastern Bentwing-bat'
- *Myotis macropus* Southern Myotis

Assessment of Significant under the 7-part test determined that the proposal is unlikely to have a significant impact on threatened entities such that a local extinction would occur.

4.3 Other Legislative Considerations

4.3.1 Key Threatening Processes

A Key Threatening Process (KTP) is defined in the TSC Act as a process that "threatens, or could threaten, the survival or evolutionary development of species, populations or ecological communities". They are listed under Schedule 3 of the TSC Act and may adversely affect threatened species, populations or ecological communities or could cause species, populations or ecological communities that are not threatened to become threatened.

Eight KTP's have the potential to operate on site and require consideration under the site proposal:

1. Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (*Manorina melanocephala*)

2. Anthropogenic Climate Change

3. Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)

4. Removal of dead wood and dead trees

5. Invasion, establishment and spread of *Lantana camara* (Lantana)

6. Infection of native plants by *Phytophthora cinnamomi*

7. Predation by the European Red Fox (*Vulpes vulpes*)

8. Clearing of native Vegetation

Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (Manorina melanocephala)

The proposal seeks to remove 0.49ha of which 0.39ha is currently vegetated in a linear configuration. The Noisy Miner is known to inhabit fragments and edges. While the proposal seeks to remove vegetation that will create a new edge on the Study Area, the additional clearing and fragmentation is considered represent a minor increase from the existing edge and site disturbance. Given the relatively small amount of clearing the proposal is unlikely to contribute to an increase in abundance and activity of the Noisy Miner.

Anthropogenic Climate Change

Modification of the environment by humans is considered to contribute to Climate Change and as a result has been listed as a Key Threatening Process. Land use change are considered by the OEH as actions that can contribute to greenhouse gas emissions. This may indirectly impact upon known or potentially occurring threatened species as most species depend on climate for their distribution.

The proposal seeks to remove 0.49ha of which 0.39ha is currently vegetated in a linear configuration. Notwithstanding the clearing of vegetation on site, the area of clearing is considered to represent a minor incremental increase in cleared areas at a local scale. On this basis, the proposal is considered unlikely to make a significant contribution to climate such that alterations resulting in impacts on locally occurring threatened species, populations or ecological communities would occur.

Competition and grazing by the feral European Rabbit (Oryctolagus cuniculus)

The proposal seeks to remove 0.49ha of which 0.39ha is currently vegetated in a linear configuration. The road shall consist of paved surfaces, footpath and a managed edge. Remaining vegetation on the Study Area shall be maintained and unaltered as a result of the proposal. As such it is considered this KTP is likely to operate in the locality, however the proposal is unlikely to generate additional significant foraging areas for this species. As such the proposal is unlikely to contribute to an increase in abundance and activity of the European Rabbit.

Removal of dead wood and dead trees

The proposal will require the removal of 0.39ha of native vegetation in a linear configuration. The vegetation contains very few dead trees or ground debris and as such will not significantly contribute to the KTP “Removal of Dead Wood and Dead Trees”.

Invasion, establishment and spread of Lantana (Lantana camara)

The site will be cleared and managed as part of the road corridor, therefore Lantana is unlikely to have any opportunity to become established in the site. The proposal is unlikely to provide an increase for establishment and spread of Lantana within the Study Area and/or promote growth in existing areas of Lantana.

On this basis it is considered that the proposal will not lead to an increase in the activity or prevalence of this KTP.

Infection of native plants by Phytophthora cinnamomi.

The soil born pathogen *Phytophthora cinnamomi* spreads in plant roots and has been known to infect a number of native plants. There was no evidence observed of *P. cinnamomi* impact on the Study Area during site investigations. Industry best practice standards are to be employed by all civil contractors during the road construction phase. It is considered this will mitigate potential for introduction and establishment of *P. cinnamomi*. Notably this has been reflected in the proposed site mitigation measures. With the employment of industry best practice standards, it is considered unlikely that the proposal will contribute to this KTP.

Predation by the European Red Fox (Vulpes vulpes).

The proposal seeks to remove 0.49ha of which 0.39ha is currently vegetated in a linear configuration. The road shall consist of paved surfaces, footpath and a managed edge. Remaining vegetation on the Study Area shall be maintained and unaltered as a result of the proposal. As such it is considered this KTP is likely to operate in the locality, however the proposal is unlikely to promote an increase in the abundance and activity of the European Red Fox.

Clearing of native vegetation

The KTP final determination lists nine factors that have the potential to impact to species distribution or result in extinction. These factors are:

1) destruction of habitat resulting in loss of local populations of individual species;
2) fragmentation;
3) expansion of dryland salinity;
4) riparian zone degradation;
5) increased greenhouse gas emissions;
6) increased habitat for invasive species;
7) loss of leaf litter layer;
8) loss or disruption of ecological function; and
9) changes to soil biota.

The proposal will remove 0.39ha of native vegetation and additional 0.1ha of cleared / managed land. Removal of vegetation to accommodate a future road, will remove habitat for the known threatened species, *A. inopina* and *T. juncea* and contribute to fragmentation in the vegetated patch. The extent of the fragmentation has been considered to be minor in the context of retention of individuals/ clumps of these threatened species and ongoing habitat opportunities across the Study Area along with pollinator and dispersal agents. At a local scale, the quantum of habitat loss is considered to be minor, relative to the 119.24ha of conservation lands to be managed in perpetuity for conservation as part of the Watagan Park approval. These conservation reserves contain representations of *A. inopina* and *T. juncea* and their habitat. Therefore, it is not considered the KTP will be increased in the Study Area or locality such that a decline and/ or extinction will occur due to reduction in habitat availability from clearing.

4.3.2 SEPP 44 – Koala Habitat Protection

Assessment of potential koala habitat under SEPP 44 requires the following steps be undertaken:

(a) Identification of 'potential Koala habitat' within the site area to be impacted; if the total tree cover contains 15% or more of the Koala food tree species listed in Schedule 2 of SEPP 44 then it is deemed to be 'potential Koala habitat'. Identification of 'potential Koala habitat requires the determination of the presence of 'core Koala habitat';

(b) Identification of 'core Koala habitat' within the area to be impacted. 'Core Koala habitat' is defined as an area of land with a resident population of Koalas, evidenced by attributes such as breeding females (females with young), recent sightings and historical records of a Koala population;

(c) Identification of 'core Koala habitat' will require that a plan of management must accompany the application;

(d) If the rezoning of lands, other than to environmental protection, involves potential or core Koala habitat then the Director of planning may require a local environmental study be carried out.

Two species of trees listed in Schedule 2 of the SEPP as a 'Koala Feed Tree Species' occurs on the Site, being *Eucalyptus haemastoma* (Scribbly Gum) and *Eucalyptus robusta* (Swamp Mahogany).

At no point where Koala feed trees persist on Site do they represent 15% or more of the total tree cover. Additionally, investigations did not detect Koalas or signs of Koalas within the Site. Therefore, the vegetation on the Site does not constitute Potential or Core Koala Habitat. On this basis no further considerations of the SEPP apply.

5 Recommendations

The following recommendations have been generated with due consideration of the proposed clearing of 0.49ha on site of which 0.39ha is vegetated and 0.1ha exists as managed/ cleared areas. The intent is to minimise the effect of clearing and potential for any indirect impacts to occur.

Pre-clearance survey

Prior to commencement of vegetation removal, a pre-clearance survey will be conducted across the areas where clearing works are to occur in accordance with the approval. These surveys are to be undertaken by a suitably qualified and experienced ecologist familiar with the biodiversity of the Lower Hunter Valley. These surveys will identify any areas containing significant habitat features (e.g. tree hollows, nests, arboreal termite terrarium) and/or observations of faunal occupation.

Where significant habitat features (nests, burrows, termite terrarium with hollows) and/or hollow bearing trees are observed during the pre-clearance survey, they will be marked all the way around the trunk at a height of approximately 1.5 metres with a band and a 'H' on no fewer than three sides (or as appropriate based on barrel size) using fluorescent spray marking paint. An alternate marking procedure such as highly visible flagging tape would also be suitable. This is to ensure a high level of visibility for construction / vegetation clearing contractors. Any tree that is known to have resident fauna present is to be marked. At the time of marking, the following attributes will be recorded:

- Tree species
- Height
- Diameter at Breast Height DBH
- Location record (GPS);
- Habitat feature;
- Number of hollows; and
- Size of hollow.

Clearing Procedure

Following completion of the pre-clearance survey, if significant habitat features are located, clearing shall generally occur in two phases as follows:

Stage 1

- Under-scrubbing of the entire Site should be carried out by a 4x4 tractor or similar with a mulching attachment with the mulch to be left to aid in soil retention.
- Non habitat vegetation will be cleared in a sequence that leaves trees that allow fauna to move to adjacent vegetation to be retained.

Stage 2

- After completion of phase 1, clearing of habitat trees / significant habitat features will commence.
- Ideally the vegetation should be cleared toward retained vegetation to ensure any displaced fauna are able to self-relocate.
- To ensure that no felled trees impact upon retained vegetation, all trees within 15 metres (or canopy height) will be felled away from, or at least parallel with, retained vegetation boundary. A spotter should be present to assist the operator.
- Hollow bearing trees are to be knocked with an excavator bucket or other machinery to encourage fauna to evacuate the tree immediately prior to felling.
- If an animal is detected in a tree prior to pushing over, the clearing activities are to cease to allow fauna time to leave, or until the animal is carefully removed from the tree.

- Tree should be “soft-felled”.
- Felled habitat trees or significant habitat features must be left for a period of at least one night in situ on the ground to give any fauna trapped in the trees an opportunity to escape before further processing of the trees.
- Felled hollow-bearing trees must be inspected by an ecologist as soon as the tree is felled.
- Any animals found in fallen trees will be inspected for injury and either treated by a wildlife carer (if required) or released into the retained vegetation of the Study Area.

At the completion of clearing works the preparation of a compliance letter will be undertaken that will outline dates of survey and clearing, number of habitat trees / significant habitat features removed, list of fauna found, condition in at time of discovery, and where they were released.

General Mitigation Measures for the Construction Phase

The following mitigation measures have been provided for implementation to ensure the retained bushland interface is appropriately managed throughout the construction phase, including appropriate location and management of construction materials:

- The site will be appropriately demarcated with barrier fencing or highly visible flicker tape (or similar) to ensure machinery is limited to the development area.
- Machinery and compound storage shall be carefully considered to ensure no impact to the retained areas within the study area.
- All contractors will be specifically advised of the designated work area. The following activities are not to occur outside of designated work areas to minimise impacts on native vegetation:
  - Vehicle movements;
  - Storage and mixing of materials;
  - Vehicle parking;
  - Liquid disposal;
  - Machinery repairs and/or refuelling;
  - Placement of the site office or shed;
  - Combustion of any material;
  - Stockpiling of soil, rubble or debris; and
  - Any filling or excavation including trenching, topsoil skimming and/or surface excavation.
- All construction vehicles/machinery are to use the designated access tracks. Speeds will be limited to reduce the potential of fauna strike and to reduce dust generation;
- Plant and machinery would be cleaned of any foreign soil and seed prior to being transported to the site to prevent the potential spread of weeds and *Phytophthora cinnamomi*;
- If machinery is transported from an area of confirmed infection of *Phytophthora cinnamomi* to the site, stringent wash down must be completed before leaving the area, removing all soil and vegetative material from cabins, trays, and under carriages. Documentary evidence is to be provided upon request;
- All liquids (fuel, oil, cleaning agents, etc.) will be stored appropriately and disposed of at suitably licensed facilities. Spill management procedures will be implemented as required.
- Rubbish will be collected and removed from the Development Estate;
- In the event that the work area where pre-clearance has occurred needs to extend outside the area investigated, further inspection would need to be undertaken by a qualified ecologist;
- During the creation of access tracks, erosion or sediment measures will be considered and installed as required;
- Weed management procedures will be implemented to prevent the spread of weeds both on and off site;
- Weed monitoring is to occur throughout the construction phase and weed removal will be carried out as necessary;

Erosion and Sedimentation Control

Erosion and sediment control measures shall be implemented in accordance with the approved Sediment and Erosion control plan to be detailed in the project CEMP to be prepared prior to commencement of civil works on site. In general, erosion and sediment control measures include:

- Identification of potential erosion areas;
- Installation and maintenance of flow, erosion, sediment and nutrient control within the site during construction ahead of pavement and kerb establishment;
- Separation of 'dirty' construction water from the 'clean' natural overland flow water;
- Coordinated work practices aimed at minimising land disturbance;
- Minimise vegetation disturbance to surrounding retained vegetation; and
- Routine site inspections of drains, channels, sediment control structures and water quality.

6 Conclusion

MJD Environmental has been engaged by Johnson Property Group Pty Ltd, to prepare an Ecological Assessment to accompany a Section 75W modification of the North Cooranbong Residential Estate 'Watagan Park' Concept Approval (07_0147: 15th Dec 2008) to the NSW Department of Planning and Environment.

The proposed 75W modification entails the provision of an alternate access configuration for the Concept Plan off Freemans Drive through land controlled by Johnson Property Group. The land is known as part Lot 12 DP 1158508, 617 Freemans Drive, Cooranbong, NSW.

The assessment aims to examine the likelihood of the proposed 75W modification having a significant effect on any threatened species, populations or ecological communities listed under the *NSW Threatened Species Conservation Act 1995* (TSC Act). This assessment recognises the relevant requirements of the EP&A Act 1979 as amended by the *NSW Environmental Planning and Assessment Amendment Act 1997*.

An EPBC Referral (2014/7315) has been submitted to and approved by the Department of the Environment (DoE). The Minister for the Environment concluded that the proposed action was not a controlled action, and that further assessment and approval under the EPBC Act is not required.

The ecological field assessment found:

- One vegetation community occurred on site being Coastal Plains Scribbly Gum Woodland (0.39ha). The remaining site area comprised Managed/ Cleared land (0.1ha).
- Two threatened flora species were recorded within the site being *Angophora inopina* and *Tetratheca juncea*.
- Two threatened microchiropteran bat species were recorded in the Study Area (Lot 12 DP 1158508) being the Eastern Bentwing-bat (*Miniopterus australis*) and Eastern Freetail-bat (*Mormopterus norfolkensis*).
- Assessment under SEPP 44 found that no 'Potential Koala Habitat' occurs within the Site and no further assessment under SEPP 44 was required.

Ecological impact assessment considered whether the removal of vegetation and cleared areas on site totalling 0.49ha would constitute a significant impact on known threatened species, populations and ecological communities from the locality such that a local extinction may occur. The assessment concluded that the proposal was unlikely to have an impact on the threatened entities assessed.

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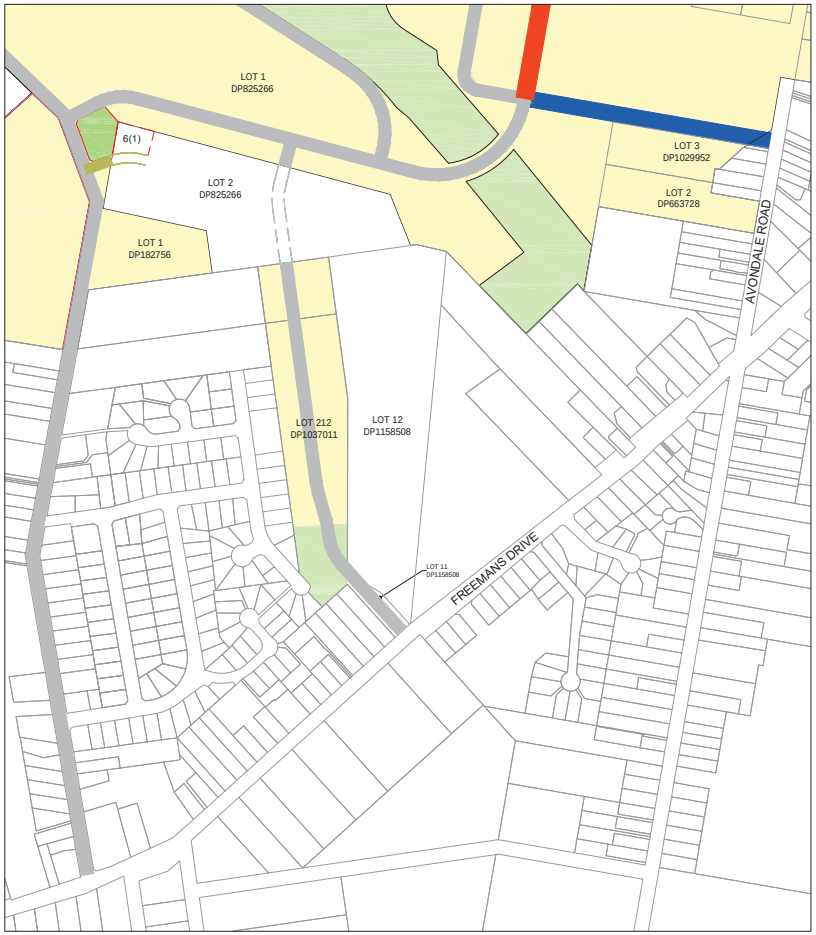
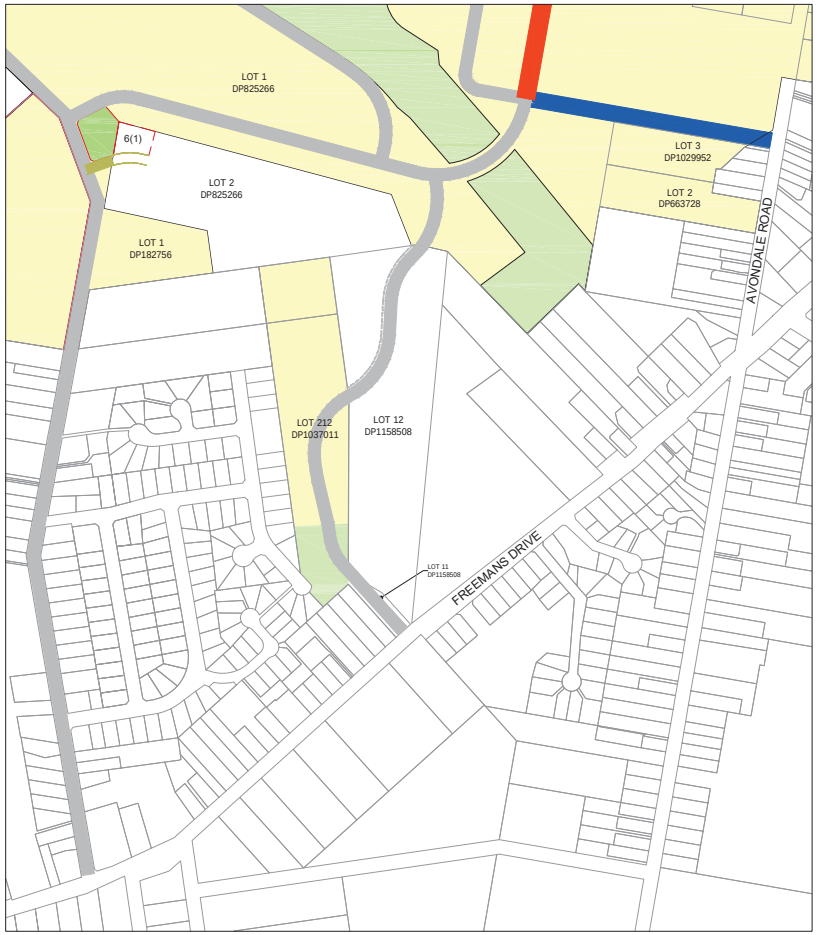
Appendix 1 Plan of Proposal



CURRENT APPROVED MASTERPLAN



PROPOSED MASTERPLAN

ROAD - 25m WIDE

ROAD - 22m WIDE

ROAD - 17m WIDE

ROAD - 14m WIDE

ver.	date	comment	drawn	pm	level information	scale (A3 original size)	notes
C	18.10.16	AMENDED ISSUE	LG	LG	DATUM: N/A CONTOUR INTERVAL: N/A	0 150 300 375m SCALE: 1:7500 (FULL)	

drawing title:

MASTERPLAN MODIFICATION

location: 615, 615c & 617 FREEMANS DRIVE, COORANBONG

council: LMCC

dwg ref: 239078(12)MP-001-C

client: JOHNSON PROPERTY GROUP

adw johnson
central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100

Appendix 2 EPBC Act Determination

Australian Government
Department of the Environment

Notification of

REFERRAL DECISION – not controlled action
Cooranbong Residential Subdivision and Cooranbong Local Water Centre (EPBC 2014/7315)

This decision is made under Section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Proposed action

person named in the referral	**Johnson Property Group PTY Limited** **ACN: 102 465 814**
proposed action	To rezone and develop residential areas and conservation land at Cooranbong NSW, with development on the residential zoning including construction of residential lots and the Cooranbong Local Water Centre [See EPBC Act referral 2014/7315].

Referral decision: Not a controlled action

status of proposed action	The proposed action is not a controlled action.

Person authorised to make decision

Name and position	James Tregurtha Assistant Secretary South-Eastern Australia Environment Assessments
signature	
date of decision	19 September 2014

Appendix 3 Ecological Survey Effort

2.5 Survey Effort and Limitations

2.5.1 Survey Effort

The level of survey effort was considered in line with the Lake Macquarie Flora and Fauna Survey Guidelines V4.2 (2012). These guidelines use a concept of 'stratification units' in order to recommended the amount of flora and fauna survey effort to be undertaken over a given area.In order to appropriately identify each vegetation community within the Site, flora survey effort was undertaken in accordance with LMCC (2012), with each individual vegetation community representing a separate stratification unit. **Table 2** represents the survey effort for flora quadrats and transects undertaken in relation to LMCC (2012) survey guidelines, with the areas per stratification unit evaluated against the results of this report (see Section 3.2.2). Note, that the Coastal Plains Scribbly Gum Woodland (MU31) is considered to be of a 'complex floristic structure'; and Red Mahogany Apple Paperbark Forest (Map Unit (MU) 42) is considered to be a 'simple floristic structure' in accordance with LMCC (2012a) definitions. In addition, targeted surveys occurred throughout the Site on several occasions. As depicted below, targeted flora surveys were in excess of reccomended survey effort.

Table 2 Flora Survey Effort of the Site

Survey Method	Vegetation Community			Total
	MU 31	MU 42	Cleared/disturbed lands	
Suggested Quadrat	2	1	0	3
Undertaken	5	1	0	6
Suggested Transect	3	1-2	0	4-5
Undertaken	6	1	1	8

The Site contains similar vegetation types throughout its extent, dominated by dry sclerophyll woodlands and forests with a small area of lower-lying swamp vegetation. In consideration of survey effort for fauna, the Site has been stratified using the LMCC (2012a) system of vegetation classification as identified during the flora surveys. **Table 3** provides a breakdown of the survey effort undertaken in relation to the suggested survey effort (LMCC 2012a), per stratification unit.

The statification of the vegetation units for fauna surveys are as follows:

- Coastal Plains Scribbly Gum Woodland (MU31) (including disturbed areas of this community); and
- Red Mahogany Apple Paperbark Forest (MU 42).

Although the cleared areas were not targeted for survey effort, the spotlighitng survey fell within these areas. Opportunistic searches for reptiles, amphibians, birds and mammals which were undertaken during all other survey efforts have not been included in the table.

Table 3 Fauna Survey Effort of the Site against LMCC Guideline

Target Species	Method	Value	Coastal Plains Scribbly Gum Woodland (3.42 ha)		Red Mahogany Apple Paperbark Forest (0.9 ha)		Cleared/disturbed lands (1.52 ha)		Total	
			LMCC Guideline	Undertaken	LMCC Guideline	Undertaken	LMCC Guideline	Undertaken	LMCC Guideline	Undertaken
Small mammals	Terrestrial A	Trap Nights	100	200	100	33	0	67	200	300
Medium sized mammals	Terrestrial B		12	24	12	4	0	8	24	36
Arboreal mammals	Arboreal B		30	80	30	12	0	28	60	120
All fauna	Motion detection Camera		Optional	4	Optional	0	0	0	0	4
Bats	Harp trap		4	8	4	4	0	0	8	12
	Ultrasonic detection		4	8	4	0	0	4	8	12
Various nocturnal mammals and birds	Spotlighting on foot (based on GPS records taken)	Hours	2x30 min 1km/hour <100ha	5	2x30 min 1km/hour <100ha	2	0	2	4	9
	Call Playback (birds)	Site	2	3	2	1	0	1	4	5
	Call Playback (Mammals)	Incorporate within Owl CPB								
Diurnal birds	20 min census	Sites	1	3	1	1	0	2	2	6
Reptiles	Targeted & Opportunistc Habitat Search		Required only in September to April	1	Required only in September to April	1	0	1	0	1
Amphibians	Targeted Habitat Search		Required only in September to April	1	Required only in September to April	0	0	0	0	1

The survey effort, for those survey methods employed for the Project, has met or exceeded the recommended survey efforts as per LMCC (2012) for the overall Site. Per stratification unit, required survey effort MU 31 has been exceeded; however, the required survey effort for MU 42 is slightly insufficient. Fauna survey effort was intentionally centred upon the area of potential impact, comprising primarily of MU 31. MU 42 is proposed to be dedicated to LMCC as conservation lands, thus priority was given to those areas not being retained for the proposed developments. Subsequently, the fauna surveys completed for the Site are considered adequate under the circumstances of the rezoning for the Project.

2.5.2 Limitations

Limitations associated with this Flora and Fauna Assessment are presented herewith. The limitations have been taken into account specifically in relation to threatened species assessments, results and conclusions.

Threatened flora species should be surveyed within their respective flowering periods to ensure accurate identification. The flowering and fruiting plant species that attract some nomadic or migratory threatened species, often fruit or flower in cycles spanning a number of years. Furthermore, these resources might only be accessed in some areas during years when resources more accessible to threatened species fail. As a consequence, threatened species may be absent from some areas where potential habitat exists for extended periods and this might be the case for the above-mentioned opportunistic species. This limitation has been reduced to some extent by the large amount of survey work that has been undertaken throughout the local area, as well as local knowledge of species occurrence.

In these instances, a precautionary approach has been adopted; as such ‘assumed presence’ of known and expected threatened species, populations and ecological communities has been made where relevant and scientifically justified to ensure a holistic assessment.

Appendix 4 Flora & Fauna Species List

Family	Scientific Name	Common Name
Fabaceae (Mimosoideae)	*Acacia baileyana*	Cootamundra Wattle
Fabaceae (Mimosoideae)	*Acacia fimbriata*	Fringed Wattle
Fabaceae/faboideae/Mimosoideae	*Acacia implexa*	Hickory Wattle
Fabaceae/faboideae/Mimosoideae	*Acacia longifolia* var. *longifolia*	Sydney Golden Wattle
Fabaceae/faboideae/Mimosoideae	*Acacia suaveolens*	Sweet Scented Wattle
Fabaceae/faboideae/Mimosoideae	*Acacia terminalis*	Sunshine Wattle
Orchidaceae	*Acianthus* spp.	Mosquito Orchid
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair
Asteraceae	*Ageratina adenophora**	Crofton Weed
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak
Loranthaceae	*Amyema congener* subsp. *congener*	Mistletoe
Primulaceae	*Anagallis arvensis**	Scarlet Pimpernel
Poaceae	*Andropogon virginicus**	Whisky Grass
Myrtaceae	*Angophora costata*	Smooth-barked Apple
Myrtaceae	***Angophora inopina* (V, V*)**	**Charmhaven Apple**
Poaceae	*Aristida vagans*	Three-awn Speargrass
Asparagaceae	*Asparagus aethiopicus**	Asparagus Fern
Asteraceae	*Aster subulatus**	Wild Aster
Poaceae	*Austrostipa pubescens*	Tall Speargrass
Poaceae	*Bambusa* sp. *	Bamboo
Proteaceae	*Banksia oblongifolia*	Fern-leaf Banksia
Proteaceae	*Banksia spinulosa*	Hairpin Banksia
Asteraceae	*Bidens pilosa**	Cobbler's Pegs
Pittosporaceae	*Billardiera scandens*	Hairy Appleberry
Blechnaceae	*Blechnum nudum*	Fishbone Water Fern
Fabaceae/faboideae	*Bossiaea obcordata*	Spiny Bossiaea
Euphorbiaceae	*Breynia oblongifolia*	Coffee Bush
Pittosporaceae	*Bursaria spinosa*	Native Blackthorn

Family	Scientific Name	Common Name
Myrtaceae	*Callistemon rigidus*	Stiff Bottlebrush
Myrtaceae	*Callistemon salignus*	Willow Bottlebrush
Cupressaceae	*Callitris* spp.	
Dicksoniaceae	*Calochlaena dubia*	Rainbow Fern
Lauraceae	*Cassytha glabella*	
Apiaceae	*Centella asiatica*	Swamp Pennywort
Adiantaceae	*Cheilanthes sieberi*	Rock Fern
Poaceae	*Chloris gayana**	Rhodes Grass
Lauraceae	*Cinnamomum camphora**	Camphor Laurel
Asteraceae	*Cirsium vulgare**	Spear Thistle
Vitaceae	*Cissus hypoglauca*	Water Vine
Vitaceae	*Cissus* spp.	
Polygalaceae	*Comesperma ericinum*	Pyramid Flower
Commelinaceae	*Commelina cyanea*	Scurvy Weed, Native Wandering Jew
Asteraceae	*Conyza bonariensis**	Flax-leaf Fleabane
Asteraceae	*Conyza* spp.*	A Fleabane
Asteliaceae	*Cordyline stricta*	Narrow-leaf Palm Lily
Myrtaceae	*Corymbia gummifera*	Red Bloodwood
Myrtaceae	*Corymbia maculata*	Spotted Gum
Malaceae	*Cotoneaster* spp.*	
Orchidaceae	*Cryptostylis subulata*	Large Tongue Orchid
Cupressaceae	*Cupressus sempervirens** (Cultivar)	Italian Cypress
Cyperaceae	*Cyathochaeta diandra*	-
Poaceae	*Cynodon dactylon*	Common Couch
Cyperaceae	*Cyperus brevifolius**	Mullumbimby Couch
Cyperaceae	*Cyperus eragrostis**	Umbrella Sedge
Cyperaceae	*Cyperus polystachyos*	-
Goodeniaceae	*Dampiera stricta*	Blue Dampiera

Family	Scientific Name	Common Name
Phormiaceae	*Dianella caerulea* var. *producta*	Blue Flax Lily
Convolvulaceae	*Dichondra repens*	Kidney Weed
Poaceae	*Digitaria parviflora*	Small-flowered Finger Grass
Sapindaceae	*Dodonaea triquetra*	Hop-bush
Solanaceae	*Duboisia myoporoides*	Corkwood
Poaceae	*Echinopogon caespitosus*	Bushy Hedgehog-grass
Boraginaceae	*Echium plantagineum**	Paterson's Curse
Poaceae	*Ehrharta erecta**	Panic Veldtgrass
Poaceae	*Entolasia marginata*	Bordered Panic
Poaceae	*Entolasia stricta*	Wiry Panic
Epacridaceae	*Epacris pulchella*	Wallum Heath
Asteraceae	*Epaltes australis*	Spreading Nut-heads
Poaceae	*Eragrostis brownii*	Brown's Lovegrass
Myrtaceae	*Eucalyptus amplifolia*	Cabbage Gum
Myrtaceae	*Eucalyptus botryoides*	Bangalay / Southern Mahogany
Myrtaceae	*Eucalyptus capitellata*	Brown Stringybark
Myrtaceae	*Eucalyptus globoidea*	White Stringybark
Myrtaceae	*Eucalyptus haemastoma*	Broad-leaved Scribbly Gum
Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany
Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-rush
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge
Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling Lily
Geraniaceae	*Geranium homeanum*	Northern Cranesbill
Phyllanthaceae	*Glochidion ferdinandi* var. *ferdinandi*	Cheese Tree
Fabaceae/faboideae	*Glycine clandestina*	Twining Glycine
Fabaceae/faboideae	*Glycine microphylla*	Small-leaf Glycine
Haloragaceae	*Gonocarpus teucroides*	Raspwort

Family	Scientific Name	Common Name
Goodeniaceae	*Goodenia heterophylla*	
Proteaceae	***Grevillea parviflora* subsp. *parviflora* (V, V*)**	**Small-flower Grevillea**
Proteaceae	*Grevillea robusta*	Silky Oak
Proteaceae	*Hakea bakerana*	-
Proteaceae	*Hakea dactyloides*	Broad-leaved Hakea
Proteaceae	*Hakea laevipes*	
Proteaceae	*Hakea sericea*	Needlebush
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea Flower
Violaceae	*Hybanthus monopetalus*	Slender Violet
Apiaceae	*Hydrocotyle peduncularis*	Pennywort
Asteraceae	*Hypochaeris radicata**	Flatweed
Dennstaedtiaceae	*Hypolepis muelleri*	Harsh Ground Fern
Poaceae	*Imperata cylindrica*	Blady Grass
Proteaceae	*Isopogon anemonifolius*	Flat-leaved Drumsticks
Poaceae	*Joycea pallida*	Silvertop Wallaby Grass
Juncaceae	*Juncus cognatus**	-
Juncaceae	*Juncus usitatus**	Common Rush
Asteraceae	*Lagenifera stipitata*	Blue Bottle-daisy
Proteaceae	*Lambertia formosa*	Mountain Devil
Verbenaceae	*Lantana camara**	Lantana
Cyperaceae	*Lepidosperma laterale*	Variable Sword-sedge
Cyperaceae	*Lepidosperma neesii*	-
Myrtaceae	*Leptospermum polygalifolium*	Tantoon
Myrtaceae	*Leptospermum trinervium*	Slender Tea-tree
Epacridaceae	*Leucopogon juniperinus*	Prickly Beard-heath
Epacridaceae	*Leucopogon virgatus*	-
Oleaceae	*Ligustrum lucidum**	Large-leaved Privet
Oleaceae	*Ligustrum sinense**	Small-leaved Privet

Family	Scientific Name	Common Name
Lindsaeaceae	*Lindsaea linearis*	Screw Fern
Lindsaeaceae	*Lindsaea microphylla*	Lacy Wedge-fern
Hamamelidaceae	*Liquidambar styraciflua**	Sweetgum
Arecaceae	*Livistona australis*	Cabbage Tree Palm
Lomandraceae	*Lomandra filiformis*	Wattle Matt-rush
Lomandraceae	*Lomandra longifolia*	Spiky-headed Mat-rush
Lomandraceae	*Lomandra multiflora subsp. multiflora*	Many-flowered Mat-rush
Lomandraceae	*Lomandra obliqua*	Twisted Mat-rush
Caprifoliaceae	*Lonicera japonica**	Japanese Honeysuckle
Celastraceae	*Maytenus silvestris*	Orange Bush
Myrtaceae	*Melaleuca linariifolia*	Snow in Summer
Myrtaceae	*Melaleuca nodosa*	Ball Honey Myrtle
Myrtaceae	*Melaleuca sieberi*	-
Meliaceae	*Melia azedarach*	White Cedar
Poaceae	*Microlaena stipoides*	Weeping Grass
Araceae	*Monstera deliciosa**	Fruit Salad Plant
Myoporaceae	*Myoporum* spp.	Boobialla
Myrsinaceae	*Myrsine variabilis*	Muttonwood
Asparagaceae	*Myrsiphyllum* spp.*	
Davalliaceae	*Nephrolepis cordifolia**	Fish-bone Fern
Ochnaceae	*Ochna serrulata**	Mickey Mouse Plant
Poaceae	*Oplismenus aemulus*	Basket Grass
Poaceae	*Oplismenus imbecillis*	-
Oxalidaceae	*Oxalis perrenans*	Yellow-flowered Wood Sorrel
Bignoniaceae	*Pandorea pandorana* subsp. *pandorana*	Wonga Wonga Vine
Poaceae	*Panicum simile*	Two Colour Panic
Apocynaceae	*Parsonsia straminea*	Common Silkpod
Poaceae	*Paspalidium distans*	-

Family	Scientific Name	Common Name
Poaceae	*Paspalum dilatatum**	Paspalum
Poaceae	*Paspalum urvillei**	Vasey Grass
Passifloraceae	*Passiflora edulis**	Common Passionfruit
Iridaceae	*Patersonia sericea*	Wild Iris
Sinopteridaceae	*Pellaea falcata*	Sickle Fern
Poaceae	*Pennisetum clandestinum**	Kikuyu, Kikuyu Grass
Proteaceae	*Persoonia levis*	Broad-leaved Geebung
Poaceae	*Phyllostachys* sp.	Bamboo
Thymelaeaceae	*Pimelea linifolia*	Slender Rice Flower
Pinaceae	*Pinus radiata**	Radiata or Monterey Pine
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum
Plantaginaceae	*Plantago lanceolata**	Ribwort
Polypodiaceae	*Platycerium bifurcatum*	Elkhorn
Poaceae	*Poa labillardierei var. labillardierei*	Tussock Grass
Araliaceae	*Polyscias sambucifolia*	Elderberry Panax
Rhamnaceae	*Pomaderris intermedia*	-
Lobeliaceae	*Pratia purpurascens*	Whiteroot
Asparagaceae	*Protasparagus plumosus**	Climbing Asparagus Fern
Dennstaedtiaceae	*Pteridium esculentum*	Bracken
Cyperaceae	*Ptilothrix deusta*	-
Rubiaceae	*Richardia brasiliensis**	White Eye
Rosaceae	*Rubus fruticosus* sp. agg.*	Blackberry complex
Rosaceae	*Rubus parvifolius*	Native Raspberry
Rosaceae	*Rubus ulmifolius**	Blackberry
Polygonaceae	*Rumex brownii*	Swamp Dock
Polygonaceae	*Rumex crispus**	Curled Dock
Salicaceae	*Salix* spp.*	
Araliaceae	*Schefflera actinophylla*	Umbrella Tree

Family	Scientific Name	Common Name
Asteraceae	*Senecio madagascariensis**	Fireweed
Poaceae	*Setaria gracilis**	Slender Pigeon Grass
Poaceae	*Setaria palmifolia**	Palm Grass
Malvaceae	*Sida rhombifolia**	Paddy's Lucerne
Solanaceae	*Solanum mauritianum**	Wild Tobacco
Asteraceae	*Solidago canadensis* var. *scabra**	Goldenrod
Asteraceae	*Sonchus oleraceus**	Common Sow-thistle
Poaceae	*Sporobolus creber*	Slender Rat's Tail Grass
Caryophyllaceae	*Stellaria media**	Common Chickweed
Menispermiaceae	*Stephania japonica* var. *discolor*	Snake Vine
Asteraceae	*Taraxacum officinale**	Dandelion
Tremandraceae	***Tetratheca juncea* (V, V*)**	**Black-eyed Susan**
Poaceae	*Themeda triandra*	Kangaroo Grass
Commelinaceae	*Tradescantia* spp.*	
Typhaceae	*Typha orientalis*	Cumbungi
Scrophulariaceae	*Verbascum thapsus* subsp. *thapsus**	Aarons Rod, Great Mullein
Scrophulariaceae	*Verbascum virgatum**	Twiggy Mullein
Verbenaceae	*Verbena bonariensis**	Purpletop
Asteraceae	*Vernonia cinerea* var. *cinerea*	-
Violaceae	*Viola hederacea*	Ivy-leaved Violet
Campanulaceae	*Wahlenbergia gracilis*	Australian Bluebell
Xanthorrhoaceae	*Xanthorrhoea latifolia*	

Family	Scientific Name	Common Name	TSC Act 1995	EPBC Act 1999
Birds				
Columbidae	*Columba leucomela*	White-headed Pigeon	-	-
	Geopelia humeralis	Bar-shouldered Dove	-	-
	Leucosarcia picata	Wonga Pigeon	-	-
	Macropygia amboinensis	Brown Cuckoo-Dove	-	-
Ardeidae	*Egretta novaehollandiae*	White-faced Heron	-	-
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis	-	-
	Threskiornis spinicollis	Straw-necked Ibis	-	-
Accipitridae	*Accipiter fasciatus*	Brown Goshawk	-	-
Charadriidae	*Vanellus miles*	Masked Lapwing	-	-
Cacatuidae	*Cacatua galerita*	Sulphur-crested Cockatoo	-	-
	Cacatua sanguinea	Little Corella	-	-
	Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo	-	-
	Eolophus roseicapillus	Galah	-	-
Psittacidae	*Alisterus scapularis*	Australian King-Parrot	-	-
	Trichoglossus haematodus	Rainbow Lorikeet	-	-
Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra	-	-
Climacteridae	*Cormobates leucophaea*	White-throated Treecreeper	-	-
Ptilonorhynchidae	*Ptilonorhynchus violaceus*	Satin Bowerbird	-	-
Maluridae	*Malurus cyaneus*	Superb Fairy-wren	-	-
	Stipiturus malachurus	Southern Emu-wren	-	-
Acanthizidae	*Acanthiza lineata*	Striated Thornbill	-	-
	Acanthiza nana	Yellow Thornbill	-	-
	Acanthiza pusilla	Brown Thornbill	-	-
	Sericornis frontalis	White-browed Scrubwren	-	-
Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote	-	-
Meliphagidae	*Acanthorhynchus tenuirostris*	Eastern Spinebill	-	-
	Anthochaera carunculata	Red Wattlebird	-	-
	Lichenostomus chrysops	Yellow-faced Honeyeater	-	-
	Manorina melanocephala	Noisy Miner	-	-
	Manorina melanophrys	Bell Miner	-	-
	Meliphaga lewinii	Lewin's Honeyeater	-	-
	Melithreptus brevirostris	Brown-headed Honeyeater	-	-
	Phylidonyris niger	White-cheeked Honeyeater	-	-
Psophodidae	*Psophodes olivaceus*	Eastern Whipbird	-	-
Pachycephalidae	*Pachycephala pectoralis*	Golden Whistler	-	-
Artamidae	*Cracticus nigrogularis*	Pied Butcherbird	-	-
	Cracticus tibicen	Australian Magpie	-	-
	Cracticus torquatus	Grey Butcherbird	-	-
	Strepera graculina	Pied Currawong	-	-
Dicruridae	*Dicrurus bracteatus*	Spangled Drongo	-	-
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail	-	-
	Rhipidura leucophrys	Willie Wagtail	-	-
Corvidae	*Corvus coronoides*	Australian Raven	-	-
Monarchidae	*Grallina cyanoleuca*	Magpie-lark	-	-
Petroicidae	*Eopsaltria australis*	Eastern Yellow Robin	-	-
Timaliidae	*Zosterops lateralis*	Silvereye	-	-
Nectariniidae	*Dicaeum hirundinaceum*	Mistletoebird		
Estrildidae	*Neochmia temporalis*	Red-browed Finch	-	-

Family	Scientific Name	Common Name	TSC Act 1995	EPBC Act 1999
Mammals				
Dasyuridae	*Antechinus stuartii*	Brown Antechinus	-	-
Petauridae	*Petaurus breviceps*	Sugar Glider	-	-
Pseudocheiridae	*Pseudocheirus peregrinus*	Common Ringtail Possum	-	-
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum	-	-
Macropodidae	*Macropus rufogriseus*	Red-necked Wallaby	-	-
Molossidae	*Mormopterus ridei*	Mormopterus species 2	-	-
	Mormopterus norfolkensis	Eastern Freetail-bat	**V**	-
	Tadarida australis	White-striped Freetail-bat	-	-
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	-	-
	Miniopterus australis	Little Bentwing-bat	**V**	-
	Nyctophilus gouldi	Gould's Long-eared Bat	-	-
	Rattus fuscipes	Bush Rat	-	-
	*Rattus rattus**	Black Rat	-	-
Canidae	*Vulpes vulpes**	Fox	-	-
Leporidae	*Oryctolagus cuniculus**	Rabbit	-	-
Amphibians				
Myobatrachidae	*Crinia signifera*	Common Eastern Froglet	-	-
Myobatrachidae	*Limnodynastes peronii*	Brown-striped Frog	-	-

Appendix 5 Assessment of Significance (7-part Test)

Section 5A of the EP&A Act lists seven factors that must be taken into account in the determination of the significance of potential impacts of proposed activities on 'threatened species, populations or ecological communities or their habitats' (threatened biota) listed under the TSC Act. The '7-part test' is used to determine whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats and thus whether a Species Impact Statement (SIS) is required to be produced.

The significance of the impacts on those threatened species and EECs which have been recorded in the Site or are likely to occur and are likely to utilise habitat to be potentially impacted by the proposal (see Table 3) have been assessed. The following threatened species have been considered.

Flora

- *Angophora inopina* Charmhaven Apple
- *Cryptostylis hunteriana* Leafless Tongue Orchid
- *Grevillea parviflora* subsp. *parviflora* Small Leaf Grevillea
- *Tetratheca juncea* Black Eye Susan

Fauna

- *Callocephalon fimbriatum* Gang-gang Cockatoo
- *Calyptorhynchus lathami* Glossy-Black Cockatoos
- *Daphoenositta chrysoptera* Varied Sittella
- *Glossopsitta pusilla* Little Lorikeet
- *Hieraaetus morphnoides* Little Eagle
- *Ninox strenua* Powerful Owl
- *Tyto novaehollandiae* Masked Owl
- *Tyto tenebricosa* Sooty Owl
- *Petaurus australis* Yellow Bellied Glider
- *Petaurus norfolcensis* Squirrel Glider
- *Mormopterus norfolkensis* Eastern Freetail Bat
- *Miniopterus australis* Little Bentwing-bat
- *Miniopterus schreibersii* oceanensis Eastern Bentwing-bat'
- *Myotis macropus* Southern Myotis

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Threatened Flora

Angophora inopina (Charmhaven Apple).

The RPS (2014c) report outlined that there were 89 individual *A. inopina* detected within the study area. All 89 individuals are found within the Scribbly Gum Woodland generally located in the mid to northern portion of the study area. The proposal seeks to remove 0.39ha of habitat for this species and 11 individuals that exist within the site on the road reserve and construction zone alignment. The remaining 78 individuals within the Study Area will be retained. Additionally, the LWC approval area contains 17 of the remaining 78 individuals on site. Two of these will be removed to accommodate the LWC and a further 4 will be planted in retained vegetation.

The North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain known occurrences of *A. inopina* along with habitat for this species, that will be rehabilitated and managed for conservation purposes in perpetuity. The removal of 11 individuals on site represents a 0.01% decrease in the overall population conserved under this approval (refer to table below).

Existing *A. inopina* Numbers within Approved North Cooranbong Residential Development			Revised outcome including the Site			
Estimated total number of individuals			Known numbers of Stems to be removed	Revised Total development area	Revised Conservation outcomes (%)	Difference between existing North Cooranbong and the Site combined (%)
Conservation Area	Development Area	Number within the conservation Area (%)				
18,891	26,761	41.38%	11	26,772	41.37%	0.01%

On this basis it is considered that the area of clearing that represents a reduction in potential area of occupation along with the removal of 11 individuals, is minor in scale and would not lead to an adverse effect on the life cycle of *A. inopina* such that a viable local population of the species is likely to be placed at risk of extinction.

Cryptostylis hunteriana (Leafless Tongue Orchid)

The proposal will result in the removal of 0.39ha of potential habitat for this species on site. The remaining potential habitat for this species will be retained within the Study Area. The North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain habitat for this species that will be rehabilitated and managed for conservation purposes in perpetuity. On this basis it is considered that the area of clearing that represents a reduction in potential area of occupation is minor in scale and would not lead to an adverse effect on the life cycle of *C. hunteriana* such that a viable local population of the species is likely to be placed at risk of extinction.

Grevillea parviflora subsp. *parviflora* (Small -flowered Grevillea)

The Small-flowered Grevillea was detected in the southern most extent of the Scribbly Gum Woodlands within the study area. Four individuals were recorded during targeted surveys. This species was not detected during the targeted surveys on site.

The North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain habitat for this species that will be rehabilitated and managed for conservation purposes in perpetuity. On this basis it is considered that the area of clearing that represents a reduction in potential area of occupation is minor in scale and would not lead to an adverse effect on the life cycle of *G. parviflora* subsp. *parviflora* such that a viable local population of the species is likely to be placed at risk of extinction.

Tetratheca juncea (Black-eyed Susan)

The RPS (2014c) report outlined that there were 79 clumps of *T. juncea* detected within the study area. All 79 clumps were found within the Scribbly Gum Woodland generally located in the mid to northern portion of the study area. The proposal seeks to remove 0.39ha of habitat for this species and 7 clumps that exist on the road reserve and construction zone alignment. The remaining 72 clumps within the Study Area will be retained.

The North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain known occurrences of *T. juncea* along with habitat for this species, that will be rehabilitated and managed for conservation purposes in perpetuity. The removal of 7 *T. juncea* clumps on site represents a 0.013% decrease in the overall population conserved under this approval (refer to table below).

Existing *T. juncea* Numbers within Approved North Cooranbong Residential Development			**Revised outcome including the Site**			
Estimated total number of clumps			**Known numbers of Clumps to be removed**	**Revised Total development area**	**Revised Conservation outcomes (%)**	**Difference between existing North Cooranbong and the Site combined (%)**
Conservation Area	**Development Area**	**Number within the conservation Area (%)**				
7,194	11,779	37.917%	7	11,786	37.903%	0.013%

On this basis it is considered that the area of clearing that represents a reduction in potential area of occupation along with the removal of 7 *T. juncea* clumps, is minor in scale and would not lead to an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Threatened Fauna

Woodland/Forest birds

- *Callocephalon fimbriatum* Gang-gang Cockatoo
- *Calyptorhynchus lathami* Glossy-Black Cockatoos
- *Daphoenositta chrysoptera* Varied Sittella
- *Glossopsitta pusilla* Little Lorikeet
- *Hieraaetus morphnoides* Little Eagle

The Gang-gang Cockatoo was not detected during survey efforts of the study area. Whilst the site has potential forging habitat that this species may frequent during the winter months, this species has only been recorded in low numbers in a 10km search of the study area. The site will remove 0.39ha potential habitat of which 3.03ha of the same habitat will be retained adjacent within the Study Area. On this basis it is considered that the area of clearing that represents a reduction in potential area of foraging habitat is minor in scale and would not lead to an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

The Glossy Black Cockatoo was also not detected on site. This species forages on *Allocasuarina* and *Casuarina* seed of which have been observed within the site and study area. Notwithstanding the North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain habitat for this species that will be rehabilitated and managed for conservation purposes in perpetuity. The proposal will remove 0.39ha potential habitat for this species from the site of which 3.03ha of the same habitat will be retained adjacent within the Study Area. On this basis it is considered that the area of clearing that represents a reduction in potential area of foraging habitat is minor in scale and would not lead to an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

The Varied Sittella is known to frequent eucalypt forest that contain rough-bark species and mature smooth bark eucalypts, similar to the Scribbly Gum Woodland found within the site. Notwithstanding the North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain habitat for this species that will be rehabilitated and managed for conservation purposes in perpetuity. The proposal will remove 0.39ha potential habitat for this species from the site of which 3.03ha of the same habitat will be retained adjacent within the Study Area. On this basis it is considered that the area of clearing that represents a reduction in potential area of foraging habitat is minor in scale and would not lead to an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

The Little Lorikeet is known to forage on flowering Eucalypts and other Mrytaceae species. The site provides foraging habitat for this species in the form of Eucalypt species. There are no known hollows that this species may use to breed within the site. Notwithstanding the North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain habitat for this species that will be rehabilitated and managed for conservation purposes in perpetuity. The proposal will remove 0.39ha potential habitat for this species from the site of which 3.03ha of the same habitat will be retained adjacent within the Study Area. On this basis it is considered that the area of clearing that represents a reduction in potential area of foraging habitat is minor in scale and would not lead to an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

The Little Eagle is known to have a large distribution and inhabit various woodland and forest vegetation communities throughout Australia. This species is highly mobile and has a large home range which this species searches when foraging. Notwithstanding the North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain habitat for this species that will be rehabilitated and managed for conservation purposes in perpetuity. The proposal will remove 0.39ha potential habitat for this species from the site of which 3.03ha of the same habitat will be retained adjacent within the Study Area. On this basis it is considered that the area of clearing that represents a reduction in potential area of foraging habitat is minor in scale for this species home range and would not lead to an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Forest Owls

- *Ninox strenua* Powerful Owl
- *Tyto novaehollandiae* Masked Owl
- *Tyto tenebricosa* Sooty Owl

The three forest owls were not detected during the survey efforts, with the exception of the Mask Owl which was heard calling outside the site and study area. The Masked and Powerful Owls are known to inhabit wet and dry sclerophyll forest of which the latter is found throughout the site. The Sooty Owl favours dense rainforest to roost sites which are not present within the site or study area.

These forest owls require large hollows to nest and roost, and also a large number prey such as arboreal mammals. There were no large hollows detected within the site or study area, however prey species were detected during the field surveys.

Notwithstanding the North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain habitat for these species that will be rehabilitated and managed for conservation purposes in perpetuity. The proposal will remove 0.39ha potential habitat for these species from the site of which 3.03ha of the same habitat will be retained adjacent within the Study Area. On this basis it is considered that the area of clearing that represents a reduction in potential area of foraging habitat is minor in scale for these species home range and would not lead to an adverse effect on the life cycle of these species such that a viable local population of Powerful Owl, Masked Owl or Sooty Owl is likely to be placed at risk of extinction.

Mammals

- *Petaurus australis* Yellow Bellied Glider
- *Petaurus norfolcensis* Squirrel Glider

The Yellow Bellied Glider was not recorded within the site or study area. This species is known to forage within Eucalypt species and are known to den in large hollows. There is also a large number of records for this species within a 10km search of the study area. During the survey no hollows suitable for this species were detected. Notwithstanding the North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain habitat for this species that will be rehabilitated and managed for conservation purposes in perpetuity. The proposal will remove 0.39ha potential habitat for this species from the site of which 3.03ha of the same habitat will be retained adjacent within the Study Area. On this basis it is considered that the area of clearing that represents a reduction in potential area of foraging habitat is minor in scale and would not lead to an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

The Squirrel Glider was not recorded on site. The preferred foraging habitat of this species is dry sclerophyll forest of which are present within the site and study area. This species is also known to den and breed in hollows which were not detected during field surveys Notwithstanding the North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain habitat for this species that will be rehabilitated and managed for conservation purposes in perpetuity. The proposal will remove 0.39ha potential habitat for this species from the site of which 3.03ha of the same habitat will be retained adjacent within the Study Area. On this basis it is considered that the area of clearing that represents a reduction in potential area of foraging habitat is minor in scale and would not lead to an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Cave Roosting Micro Bats

- *Miniopterus schreibersii oceanensis* Eastern Bentwing-bat'
- *Miniopterus australis* Little Bentwing-bat

The Eastern Bentwing Bat was detected during field survey the Study Area whilst the Little Bent Wing Bat was not. These species require specific roosting habitat and inhabit various vegetation communities whilst foraging. The site does not have suitable roosting habitat that is required by these bats such as caves or artificial structures. Notwithstanding the North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain foraging habitat and potential roosting habitat for these species that will be rehabilitated and managed for conservation purposes in perpetuity. The proposal will remove 0.39ha potential foraging habitat for these species from the site of which 3.03ha of the same habitat will be retained adjacent

within the Study Area. On this basis it is considered that the area of clearing that represents a reduction in potential area of foraging habitat is minor in scale and would not lead to an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Hollow Roosting Micro Bats

- *Mormopterus norfolkensis* Eastern Freetail Bat
- *Myotis macropus* Southern Myotis

Of the two above mentioned Hollow roosting bats the Eastern Freetail Bat was the only species detected during the field survey. No hollows were detected on site during field surveys and thus the site is only considered to offer foraging habitat for these species. Notwithstanding the North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands that contain foraging habitat and roosting habitat for these species that will be rehabilitated and managed for conservation purposes in perpetuity. The proposal will remove 0.39ha potential foraging habitat for these species from the site of which 3.03ha of the same habitat will be retained adjacent within the Study Area. On this basis it is considered that the area of clearing that represents a reduction in potential area of foraging habitat is minor in scale and would not lead to an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

No endangered populations were considered as having potential to occur on site. Therefore, the action proposed is not likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

No EEC or CEECs were considered as having potential to occur on site. Therefore, the action proposed is not likely to have an adverse effect on the life cycle of the community or substantially modify an ecological community composition such that a viable local population of the species is likely to be placed at risk of extinction.

d) In relation to the habitat of a threatened species, population or ecological community:

i. the extent to which habitat is likely to be removed or modified as a result of the action proposed,

The proposal seeks to remove 0.39ha of Coastal Plains Scribbly Gum Woodland. This represents the extent of habitat removal for threatened species assessed under this 7-part test.

ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The proposal is linear in nature and shall fragment an existing patch of Coastal Plains Scribbly Gum Woodland into two smaller patches. The maximum separation distance to accommodate the road reserve and construction zone is 20 metres. The proposal will not isolate any areas of existing vegetation.

iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality

While the proposal will result in an increase in fragmentation, two patches of Coastal Plains Scribbly Gum Woodland shall be retained with a maximum separation of 20 metres.

To this end, it is considered that pollinator and dispersal agents shall be maintained between these two patches for known threatened flora species occurring within the Study Area.

Regarding threatened fauna and their habitat, Part a) of this 7-part test determined that the removal of habitat would not constitute a significant impact to local populations such that a local extinction would occur. Despite the 20 metre fragmentation the retained vegetation patches of the Study Area will allow for continued dispersal between patches and maintenance of habitat and resources contained therein.

On a wider scale the North Cooranbong Residential Estate 'Watagan Park' Concept Approval provides 119.24ha of environmental conservation lands to be rehabilitated and managed for conservation purposes in perpetuity. These areas contain known occurrences of the threatened flora assessed herewith along with a greater diversity of habitat and habitat resources for threatened fauna.

On this basis the removal of habitat on site is not considered to be significant for the long term survival of the threatened species or ecological community assessed herewith.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)

No critical habitat for any threatened species occurs on site, therefore the proposal is unlikely to impact upon such habitat.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

Threat abatement plan or recovery plans have been prepared for four species being assessed as follows:

<u>Forest Owls</u>

- Powerful Owl (Ninox strenua);
- Masked Owl (Tyto novaehollandiae); and
- Sooty Owl (Tyto tenebricosa).

The removal of habitat as a result of the Project is inconsistent with objective 5 (minimise loss and fragmentation of owl habitat areas) of the large forest owl recovery plan (DEC 2006).

<u>Mammals</u>

- Yellow-bellied Glider (Petaurus australis)

Clearing of vegetation on Site is inconsistent with objective 2 (encourage and assist in improving the protection and management of Yellow-bellied Glider and its habitat) of the Recovery plan for the Yellow-bellied Glider (NPWS 2003).

More broadly the NSW OEH are in the early phases of implementing the 'Saving our Species' program, that aims to secure species in their natural settings for the next 100 years. The intent is to manage threatened species one of six streams being:

1) Site managed species
2) Iconic species
3) Data-deficient species
4) Landscape-managed species
5) Partnership species
6) Keep watch species

Based on management allocation each species will be prioritised by OEH. At the time of reporting, all fauna species assessed were nominated as 'Landscape-managed Species'. The status of flora species was is discussed below:

- *Angophora inopina* Charmhaven Apple is nominated as "keep watch species"
- *Grevillea parviflora* subsp. *parviflora* Small Leaf Grevillea "data deficient species"
- *Tetratheca juncea* Black Eye Susan is nominated as "keep watch species"
- *Cryptostylis hunteriana* Leafless Tongue Orchid

A strategy for the management of *Cryptostylis hunteriana* has been developed under the NSW Save Our Species program. Under the program the species has been assigned to the Site-managed species stream. In order to facilitate long term conservation of this species, two conservation management sites have been set up in NSW as follows:

- Bulahdelah in Great Lakes LGA
- Tomaree Head in Port Stephens LGA

The site is not located in or adjacent to either of the dedicated conservation management sites. Furthermore, the proposal site does not have any recorded individuals of this species and will only remove a small portion (0.39ha) of potential habitat associated with the species. On this basis the proposal is unlikely to greatly contravene any objectives or actions necessary to maintain the local population of these species.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Key Threatening Processes (KTPs) are listed under Schedule 3 of the TSC Act 1995. KTPs considered relevant to the proposal is described in **Section 4.3.1**. This assessment concluded that the proposal was unlikely to trigger KTPs currently not operating on site and/or not contribute to or increase the activity of a KTP potentially operating on the site.